Metals Review

THE NEWS DIGEST MAGAZINE

Volume XXV No. 5 May, 1952

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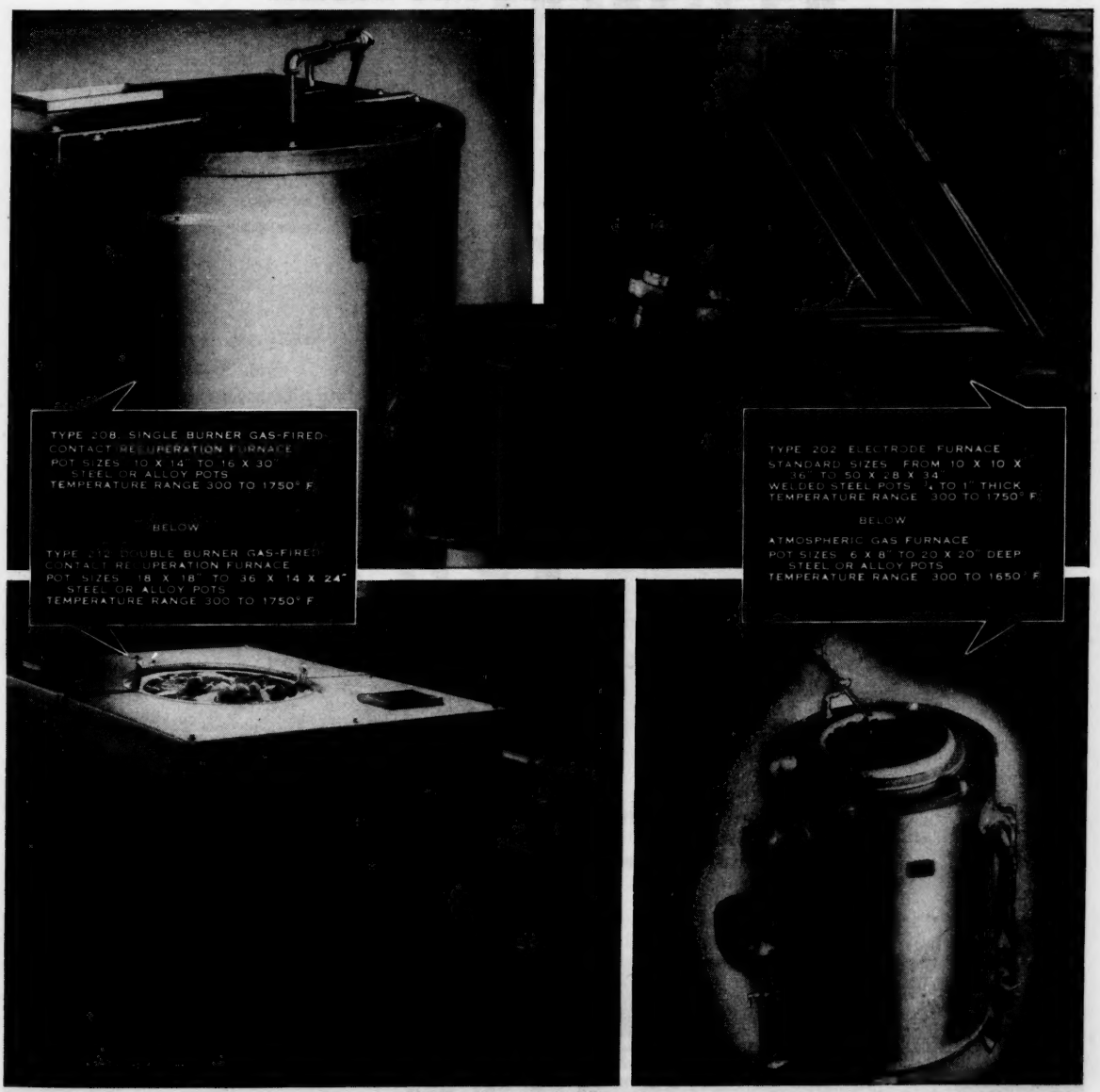
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PHILADELPHIA OCT. 20-24

Metals Review

THE NEWS DIGEST MAGAZINE

VOLUME XXV, No. 5 MAY, 1952

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NATIONAL METAL CONGRESS & EXPOSITION

Convention Halls, Philadelphia • October 20-24, 1952

Competition for Students at the 1952 Metallographic Exhibit

THE DETAILS ▶ Undergraduates can now compete on an equal basis at the metallographic exhibit held each year at the National Metal Congress and Exposition without limitations as to subject matter or techniques. Separate panels will be erected for adequate display of their best work. It is not necessary that the Entry show anything novel in microstructure or techniques; Excellence of student performance in the school's laboratory will be judged by the same jury which appraises the work of professionals. Prizes will be awarded as follows:

First Prize—Bronze Medal and $25 cash.
Honorable Mentions—Ribbon and $10 cash.

THE RULES ▶ Entrants are restricted to undergraduate students of academic institutions. ¶No more than two entries will be accepted from a single student. ¶Work must be done during the current academic year. ¶ Entries must be mounted separately on stiff cardboard. ¶ Each mount must contain pertinent information regarding subject, etchant, magnification, and special techniques (if any). ¶ Maximum size of mount, 14 x 18 in. ¶ Entrant must sign mount and give name of institution, course being studied, and year of graduation. ¶ Mount must be signed by department head, as evidence that the above conditions are met.

Send Entries (BEFORE SEPTEMBER 1, 1952) to

METALLOGRAPHIC EXHIBIT—*Student Division*

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Surface Treatment and Finishes for Metals Subjects of Lectures

Reported by L. F. Franz
Boeing Airplane Co.

The second session of the Annual Educational Lectures of the Puget Sound Chapter A.S.M. was held on Feb. 20. J. A. Finley, professor at the University of Washington, moderated at the lectures, which were presented in the very interesting form of an open panel discussion on "Surface Treatment and Finishes for Metals".

"Copper and Nickel-Base Alloys" were discussed by the first speaker, C. B. Holder of Eagle Metals Co. He gave a short history of the production and development of nickel, and the problems encountered by early smelters who thought the ore was copper. Mr. Holder also discussed the properties of copper and nickel alloys, corrosion resistance being the most important, and the effect of various surface finishes on these properties. In addition, these metals are used as coatings and cladding on other materials.

The second speaker, Earl T. Hayes, chief, Physical Metallurgical Section, Bureau of Mines, Albany, Ore., talked on "Surface Treatments and Finishes for Titanium and Zirconium and Their Alloys".

Dr. Hayes discussed the method of producing and purifying these metals, and the problems involved in machining, grinding, drilling, cleaning, and welding. They have excellent corrosion resistance, due to a very thin, colorless, tight oxide film. Other materials cannot be plated onto titanium and zirconium because of this film, nor can titanium be plated onto other metals. Titanium and zirconium can be joined by heliarc, butt welding, and spot and seam welding, but not by other standard welding methods.

Puget Sound Features Three Speakers in Educational Lecture

Reported by L. F. Franz
Boeing Airplane Co.

Puget Sound Chapter A.S.M. presented the final session of its Annual Educational Lectures on March 19. The lectures, presented in the form of an open panel discussion on "Surface Treatments and Finishes for Metals", were moderated by W. H. Turner of Pacific Metals Co.

"Aluminum and Aluminum Alloys" was the main topic for discussion.

The first speaker of the evening was J. W. Sweet, chief metallurgist, Boeing Airplane Co. He spoke on "Surface Finishes Resulting From Machining, Heat Treating, and Abrasive Cleaning", and discussed the surface conditions found on as-received raw stock and surface conditions developed during processing of parts, and the methods used to reveal and evaluate these surface conditions. The processing of parts includes machining and heat treating.

The speaker then discussed several of the abrasive and mechanical means for improving the surface appearance of aluminum alloys, and he also gave definitions for several of the terms used by the trade.

R. N. Page, research advisor, Boeing Airplane Co., the second speaker, discussed "Chemical and Mechanical Cleaning and Chemical Coatings of Aluminum and Aluminum Alloys". His talk dealt with vapor degreasing, particularly alkaline vapor, and the problems involved in this method of cleaning. Removal of the natural oxide, which is about 0.01 μ thick, is necessary to obtain certain chemical finishes, along with other reasons. Chemical finishes have several functions, such as corrosion protection, paint base, and decorative finishes.

The two principal methods of obtaining "Metal Coatings"—the subject covered by the third speaker, G. H. Kissin, finishing department head, Kaiser Research Laboratory, Kaiser Aluminum and Chemical Corp.—are cladding and electroplating.

Cladding is a fabricating process rather than a finishing process, but it does provide a finishing coat. Many problems are encountered in electroplating metals onto aluminum because of the oxide coating. Both the fusion method and the zinc immersion process are in use; and several other methods have been and are being developed, some of which require the removal of the oxide film, while others take advantage of it. Some platings are used as a base for further plating or as a strike for bonding methods.

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The Reviewing Stand

A RECENT LETTER in the editor's mail started out by saying: "First of all, we would like to congratulate you on the very fine job you are doing with the A. S. M. Review of Metal Literature, especially with the new classifying system. It is certainly a pleasure to use the 1950 edition."

We are generally a little suspicious of such a glowing opening, and sure enough the catch came to light in the next paragraph: "We are involved in several literature surveys, and have started with the abstracts in the A. S. M. Review . . . We are aware that other literature survey abstracts are available, such as *Metallurgical Abstracts* (British Institute of Metals), *Abstracts* of the British Iron and Steel Institute, *Chemical Abstracts, Industrial Arts Index* and *Engineering Index*. Is there a necessity for covering one or more of these other abstract publications to have a complete survey of the world's current literature on metallurgy?"

We would dearly love to reply to this gentleman with a flat and unequivocal statement that the A.S.M. Review of Current Metal Literature is the only source he need consult for a "complete" survey in any field of metallurgy, but after much soul-searching, strict honesty compels a qualification of the answer to "reasonably complete".

In fact, a couple of years ago we got a little curious about the answer to this question ourselves. So we dug out a year's file of the *A. S. M. Review of Metal Literature, Metallurgical Abstracts, Abstracts* of the Iron and Steel Institute, and *Chemical Abstracts* and went to work. The results of this statistical survey were interesting enough to form the basis for a paper presented at the June 1950 meeting of the Metals Section of the Special Libraries Association. In the light of the above-mentioned inquiry, it is possible that a good many metallurgists who do their own literature searching would be just as interested as the librarians in a comparative analysis of these abstracting services. Consequently a digest of the S.L.A. paper begins on page 6 of this issue of *Metals Review*.

In the two years intervening since the survey was made the Metal Literature Review coverage has been considerably broadened. It might even conceivably be possible that a survey based on the 1951 volume could be characterized simply and gratifyingly as "complete" without resorting to that convenient hedge of "reasonably".

M.R.H.

Abstracting Journals
A Comparative Survey

Extracts from "The Technical Society as a Library Resource", by Marjorie R. Hyslop. Transactions of the 41st Annual Convention, Special Libraries Association, 1950, p. 106-119.

IT MAY BE SAID without exaggeration that the *ASM Review of Metal Literature* published by the American Society for Metals, *Metallurgical Abstracts* published by the Institute of Metals, and the *Abstracts* of *Current Literature* published by the Iron and Steel Institute constitute the leading abstracting publications serving the metallurgical field. Two others, more general in nature, are important in searching for metallurgical information, namely, *Chemical Abstracts* and *Engineering Index. Engineering Index* has not been considered in this comparative analysis because first-hand information will be available from the next speaker.

Chemical Abstracts, because of its time-honored position as a leading technical abstracting service in this country, its long familiarity to librarians and research workers, and the wealth of metallurgical information it contains, has been included in the survey now to be described.

The principal purpose of this analysis is to indicate the various points of similarity and of difference between the four services. Data were obtained by checking all of the abstracts in several issues of the *A.S.M. Review of Metal Literature* against the author indexes of the other three publications and vice versa. Anonymous articles were omitted from consideration. The results of this check indicated that no one of the four publications included all of the abstracts covered by the other three, although the *A.S.M. Review* appeared to be the most comprehensive.

To determine the specific reasons for these differences in coverage, the four journals have been analyzed on the basis of five aspects of an abstracting service. Briefly, these are:

1. Kind of abstract, whether informative or indicative.
2. Timeliness—the time lag between publication of the original reference and appearance of the abstract.
3. Selectivity—how far does the editor go in selecting material of permanent value and weeding out unimportant literature.
4. Source material—extent of title list of periodical journals; inclusion of books, patents, government publications, etc.
5. Subject matter.

The first two of these—kind of abstract and timeliness—have to do with the physical aspects of the abstract, while the last three—selectivity, source material and subject matter—will account for the difference in coverage of the four abstracting services. The following discussion will consider each of these aspects in turn.

Kind of Abstract
Informative vs. Indicative

The indicative abstract merely tells very briefly what the literature reference is about, indicating its content only in a general manner. It is not intended as a substitute for reading the original article; it merely indicates whether or not the reference might contain the information being sought.

A.S.M. Review is the extreme example of the indicative abstract. So far does it lean in this direction that the items are not even officially designated as abstracts but are better described as "annotations". Often a single sentence or phrase elaborating the title is sufficient. In other instances, when dealing with highly theoretical or involved subjects, reference may be made to some of the procedures, conclusions and results of an investigation.

Chemical Abstracts, on the other hand, represents the extreme in an informative abstract. An attempt is made to report all of the new material contained in the article—even to the footnotes; specific reference is likewise made to all the information in the article that is suitable for index entries. Often the abstract can substitute for a reading of the original reference, particularly foreign literature and other material of limited accessibility. However, there are instances, even in *Chemical Abstracts,* where an indicative or "descriptive" abstract is sufficient.

The two British journals fall somewhere between these two extremes of treatment, with *Metallurgical Abstracts* being distinctly of the informative type. It differs from *Chemical Abstracts* in that it is sometimes "critical"—for example, the abstract may carry such a statement as "The results are of a rather qualitative nature and require further development." On the whole, the items are somewhat less detailed than in *Chemical Abstracts,* although sufficient information is often given to offer an adequate substitute for reading the original.

The Iron and Steel Institute abstracts, according to the editor, are informative or indicative, depending on the needs of each article. Length varies considerably, some of the informative abstracts being on a par with *Metallurgical Abstracts,* while others are considerably briefer. They are not critical.

Timeliness

In this category *A.S.M. Review* is far and away the most prompt in its publication schedule—in fact, the publisher's claim that it is the most timely and prompt technical abstracting service in the world has yet to be challenged. Specifically, all of the annotations in any one issue of *A.S.M. Review* represent material that was received in the library of Battelle Memorial Institute in a period ranging from 3 to 7 weeks prior to mailing date of the magazine. This means that articles in the March 20th issue of *Steel,* for example, were listed in the April issue of *A.S.M. Review* mailed on April 15.

Since the preparation of an informative abstract, particularly by outside experts, is a more time-consuming process than the preparation of the indicative type, the other journals do not attempt to maintain such a definite schedule, and no specific statements can be made concerning their time intervals.

Selectivity

In the matter of selectivity, the four journals rank in about the same order as they do in the matter of informative vs. indicative treatment. From the metallurgical standpoint, *Chemical Abstracts* is the most selective (despite the editor's statement that "*Chemical Abstracts* is not selective in its coverage beyond the policy of sticking to chemistry and to new stuff"). What is meant by its limitation to chemistry will be discussed under the heading of "subject matter"; it is necessary here only to point out that *Chemical Abstracts* does not go in for what might be called the practical aspects of plant operation.

"New" material is interpreted by *Chemical Abstracts* as being information obtained by experimental investigation or as the result of experience, as in building or operating an industrial plant. Types of material which are omitted or given only brief mention are compilations or reviews,

particularly if fragmentary or without references, accounts of meetings, published discussions of articles, lectures or addresses, and anonymous articles.

Next in order of discrimination comes *Metallurgical Abstracts*. According to the editor: "Fundamental and practical aspects are given equal consideration in the publication of abstracts, and we aim to be as comprehensive as possible. We do not aim to abstract, however, 'pot-boiling' articles from popular journals on matter which is of common knowledge, nor elementary articles in journals not concerned with the professions of metallurgy or engineering, e.g., in the popular science magazines."

The user of *Metallurgical Abstracts* is aided in this matter of selectivity by two standard signs which indicate the different classes of paper abstracted. The asterisk (*) is used before the title of a paper to indicate that the article deals with original research work, and a dagger (†) is printed before the title to indicate that the article is a first-class review of the subject.

The Iron and Steel Institute abstracts all articles likely to be of

(*Continued on p.* 12)

METAL SHOW NEWS

Dateline: Philadelphia, Oct. 20-24

A month-by-month preview of the National Metal Congress and Exposition

MAY—In October, about 50,000 Americans, with jobs to do and little enough time in which to do them, will still take time off from their tasks to spend a few days at the Metal Show.

There will be presidents, executive veepee's, and other top brass among the visitors. Metallurgists, metals engineers, and designers will rub elbows with production men, shop superintendents and materials handling experts. All classifications of business and industry will be there to see what progress has been made in the metals industry during the past year.

When management's key men get so bogged down in homework that they haven't time to back off and take a look at what the other fellow has been doing and why, then limited horizons and "thinking it-can't-be-done" perspectives are bound to develop.

Not enough top management realizes this. Fortunately, however, each year more and more management men are coming to the Metal Show. They make it possible for at least a key group of their staff to get out into the sunlight of progress and let some of it rub off on them. There'll be more of that than ever this year, which brings us to look closer at past records of attendance.

It would seem that if any group of men had sound reasons for attending the Show, it would be the metallurgists. Yet, records over the past several years have shown no appreciable increase in the number of metallurgists who do attend the Shows. That's one of those odd events that makes a man wonder, what goes here? Well, what does? Not being a metallurgist, this writer can say pretty much what he thinks; and that is, simply, metallurgists have not made enough noise in their own plants about the Metal Show to gather the necessary metallurgical following.

How is the boss to know it is necessary to send you to this big clearing house of ideas, uses, new developments, and processes for metals if *you*, the metallurgist, don't make him see its values?

We're reminded of one top "metal-mixer" at the Detroit Show last fall who stood before one rather sensational display and shook his head in amazement. He mumbled something to himself about not believing what he was seeing. Interested, we asked questions. It seems that an ingenious manufacturer had made a piece of metal do something it wasn't supposed to do. Right here we pause to take that considered look we talked about above.

If you don't see it, if you don't bump squarely into the things other men are doing with metals, you'll never know what's really going on. One of the deeply penetrating benefits derived from attending the Metal Show is something too few of us realize. It is never on display, it doesn't walk up and shake hands with you—but, it stays with you long after the show is over for the year. It is the *ideas* which originate *at* the Show from which the chief benefits of the Show are derived, ideas which are born in the minds of imaginative and resourceful men who have observed the results of another man's ideas.

There's a lot more, of course. In fact, if a single metallurgist attempts to cover the Show and report on it alone for his company, he's sure to miss many valuable pointers. That would suggest that each company should send more than one man to cover the Show. It's a sound suggestion, too, because with each man attending, there will be that many new reactions and ideas for the firm to evaluate. The trick is to multiply the number attending times their ability to absorb what they see.

So, *you* are a metallurgist. You work in a pretty sizable plant. You know the importance of covering the Show. But, does your boss know?—does your sales manager know? How are they expected to manifest enthusiasm for this big annual event if *you* don't!

It's as simple as that. The most effective promotion under the sun is still by word-of-mouth enthusiasm of the kind that infects all who hear you. Better still, expose anybody and everybody in a key spot in your firm to the mailing pieces being distributed by the American Society for Metals . . . to the steady flow of highly geared promotional material you'll be receiving over the next few months. Show them *all* what you're talking about, convince them of the importance of attending the Metal Show. Make it strong and make it good because you can't be too enthusiastic. You can't oversell so big and so important a Show to the top people in the nation's metal industries.

C.S.

Reviews Heat Treatment Fundamentals

Morris Cohen (Right), Professor of Physical Metallurgy, Massachusetts Institute of Technology, Is Shown With W. T. Lankford, Technical Chairman of the March Meeting of the Pittsburgh Chapter. Dr. Cohen reviewed the fundamentals of hardening and tempering of plain carbon and alloy steels

Reported by
Charles F. Sawyer, Jr.

Plant Metallurgist
Vanadium-Alloys Steel Co.

At the March meeting of the Pittsburgh Chapter A.S.M., Morris Cohen, professor of physical metallurgy at Massachusetts Institute of Technology, spoke on "Hardening and Tempering of Steel". Dr. Cohen reviewed the fundamentals of hardening and tempering along with the corresponding changes in structure to give a comprehensive picture of the heat treatment of plain carbon and alloy steels.

Starting with isothermal transformation diagrams, Dr. Cohen showed the three ranges of reactivity of austenite decomposition: pearlite, bainite, and the desirable martensite for steel hardening. As the carbon content of the steel increases, the amount of austenite retained at room temperature increases because the martensite range is lowered.

Dr. Cohen then gave three definitions for terms relating to steel heat treatment which are sometimes confused: (*a*) hardening — getting martensite; (*b*) hardenability—avoidance of pearlite and bainite; and (*c*) hardness—carbon in martensite.

The body-centered cubic unit cell of alpha iron is elongated in the "c" dimension and contracted in the "a" dimension by the intruding carbon atoms to form the tetragonal unit cell of martensite. The equilibrium solubility of carbon in alpha iron is less than 0.0001%, but in the gamma iron the carbon is readily soluble, and on quenching the carbon is trapped in the alpha iron as the martensitic transformation takes place. Thus, at 1.00% carbon, the martensitic structure is supersaturated over 10,000-fold. As the carbon content of the steel increases, and the tetragonal distortion of the resulting martensite is enhanced, the hardness is increased accordingly.

When martensite forms, residual stresses are generated from the expansion which takes place during transformation. The whole mass does not transform simultaneously, but from the surface toward the center. Thus, when the center finally transforms, the previously transformed surface is placed in tension. The martempering process partially avoids these peak stresses which are generated by quenching in water or oil.

In discussing tempering, Dr. Cohen pointed out that room temperature is just another tempering temperature, and that the usual tempering reactions go on, but at a much slower rate than at some more elevated temperature. During aging, carbon is rejected from the martensite, causing a contraction, while retained austenite transforms and causes an expansion. Thus, dimensional stability cannot be attained without proper tempering.

Several slides illustrated the effects of various tempering treatments on dimensional stability. In 52100 steel, tempering in the range of 250 to 400° F. stabilizes the retained austenite and decomposes the martensite, so that a high degree of dimensional stability can be obtained along with high hardness. However, steels with large quantities of retained austenite should be refrigerated before tempering (to lower the amount of retained austenite) if dimensional stability is to be achieved.

There are three main stages of tempering. First is contraction and decrease in magnetization during the rejection of carbon from the martensite. This carbon is rejected as a hexagonal close-packed precipitate $Fe_{2.4}C$. Expansion and increase in magnetization are then caused by the transformation of retained austenite; and finally, contraction and decrease in magnetization occur during the formation of Fe_3C from the transition precipitate $Fe_{2.4}C$.

Higher alloy steels have a fourth stage of tempering where complex alloy carbides form from the Fe_3C and the alloying elements. Silicon steels have a fifth stage where the Fe_3C decomposes to graphite.

The 500 to 600° F. embrittlement of alloy steels is in the range where the retained austenite is transformed on tempering. However, the embrittlement is not caused by the austenite decomposition, but appears to be a property of the martensite itself. Indications obtained by subtracting out the effect of the second stage of tempering point to the formation of Fe_3C in the beginning of the third stage as probably responsible for the embrittlement.

Dr. Cohen pointed out that research on the fundamentals of tempering has been receiving increased attention, and a science of tempering is building up to match the more glamorous science of hardening.

Alcoa Plans Expansion

The Aluminum Co. of America has immediate plans for expanding their fabricating facilities in the Pacific Northwest. These plans call for extensive modernization and revision of the ingot casting facilities at the Vancouver (Wash.) Works of the company. This would mean increased production of commercial notch-bar ingots and rolling ingots as well as the production of extrusion, forging and other types of fabricating ingots for use by Alcoa's own operations and for sale to fabricating customers.

The current expansion by Alcoa is a forerunner of a projected plan to extend and diversify the fabrication of primary aluminum at Vancouver.

Twenty Years Ago

Quotes From *Metals Review*
April 1932

"The technical speaker at the March meeting of the Detroit Chapter was R. S. ARCHER, director of metallurgy of A. O. Smith Corp. [now metallurgical engineer, Climax Molybdenum Co., New York]. His subject was 'The Use of Aluminum Alloys in the Automotive Industry'."

"The subject of steel 'Personality', which has been discussed before many chapters by B. F. SHEPERD, chief metallurgist of Ingersoll-Rand Co., national director, and member of the Lehigh Valley Chapter, was at last presented to his home chapter on March 4."

ASM Helps Students Find Summer Work

An employment service for engineering students during the summer months has been inaugurated by the American Society for Metals, according to an announcement made by W. H. Eisenman, national secretary.

The service is without cost to either the employer or the engineering student who seeks practical experience and income during summer vacation from his studies. Some 196 prominent firms from coast to coast have specified a total of 1858 openings for engineering students during the summer months of 1952. These job opportunities are in various departments, manufacturing, engineering, metallurgical, laboratory, machine shop, heat treating, finishing, testing, welding, foundry and others.

"Our purpose in establishing this free employment service for the summer months is two-fold," Mr. Eisenman said. "We want to assist our hard-pressed American industry in its need for skilled workers in all engineering departments. We also recognize the immense benefits which will accrue to engineering students who are able to see at first hand just how their knowledge and training must be applied on the job."

This summer employment service for engineering students is directed particularly to the Society's principal interest—the metal industry, both production and fabrication. "Students in all branches of engineering covered by this industry are invited to take advantage of the opportunities for summer employment," Mr. Eisenman said. "We have printed a complete list of industrial firms offering summer jobs, together with information about the size of the company, the person to contact, principal product, rate of pay, type of work, and how to make application for the job."

The printed list of summer job opportunities for engineering students is arranged geographically. The forms are being distributed to the heads of all engineering schools, and to many other special groups of engineering students and interested individuals.

Cleveland Hears Talk On High-Speed Flight Problems

Reported by T. G. Thurston

Sales Engineer

Bryant Industrial Division

The problems being encountered in supersonic flight were covered in an interesting talk given by J. F. Victory, executive secretary, National Advisory Committee for Aeronautics, before the Cleveland Chapter A.S.M. meeting in honor of sustaining members on Feb. 4.

Now that speeds beyond the so-called sonic barrier have been attained, Dr. Victory commented, a new challenge has been approached. This is the heat barrier, which becomes a vital factor at speeds in excess of 1500 miles per hr.

Dr. Victory expressed complete confidence in the ability of metallurgical and allied sciences to cope with the situation. The heat barrier will be overcome, as was the sonic barrier, through improvements in alloys and design.

Chipman at Ottawa Valley

Reported by A. S. Vince

Royal Canadian Mint

John Chipman, national president A.S.M., and head of the department of metallurgy at Massachusetts Institute of Technology, discussed the "Future of Metallurgical Education" at National Officers' Night of the Ottawa Valley Chapter in March.

Since Dr. Chipman's talk is being given before a number of chapters it will not be reported here in detail.

New ASM Chapter Organized in Phoenix

Shown Discussing Plans for the Newest A.S.M. Chapter in Phoenix Are, From Left, William Park Woodside, Chairman of the Board, Park Chemical Co., Detroit; W. B. Arness, Engineer, Goodyear Aircraft; W. H. Eisenman, National Secretary; and Donald Rich, Vernon Tool Co.

Plans for organizing the 82nd Chapter of the American Society for Metals were formulated during a dinner meeting of interested men in Phoenix, Ariz., on March 31. Engineers from plants in the area employing men eligible for membership were in attendance.

This new chapter has come into existence through the efforts of William P. Woodside, the originator of A.S.M., and chairman of the board of Park Chemical Co., Detroit, and a past president of A.S.M. "Billy" Woodside originated the idea for the Society and organized the first chapter in 1913; now, approximately 40 years later, it was he who assisted in the formation of this 82nd chapter.

Through the energy and perseverance of Donald Rich of the Vernon Tool Co., and the assistance of William B. Arness, engineer with the Goodyear Aircraft Corp., and A.S.M. member of long standing, 60 metal engineers attended the organization dinner.

The dinner was unique in that, with the presence of W. H. Eisenman, national secretary, only the presence of Albert E. White was needed to have all A.S.M.'s living founder members at the meeting.

Mr. Eisenman outlined to the guests at the dinner the possible service of an A.S.M. chapter to its members and to industry, and recounted the present services of the national body, as well as its plans and hopes for the future.

An Interim Board was authorized to increase the members of the Executive Committee, to plan for meetings for the remainder of the year, and to elect permanent officers.

At a later meeting of the Interim Board, plans were made to hold the first meeting early in May, at which time it is expected that the Committee will be expanded. A lecturer will be invited to speak, and plans for showing industrial movies have been made. The Board appointed the officers of the Chapter, as follows:

Chairman, W. B. Arness, Engineer, Goodyear Aircraft Corp.; Vice-Chairman, Donald A. Rich; Secretary-Treasurer, John R. Decker, Metallurgist, Goodyear Aircraft Corp.; Program Chairman, O. Lee Mitchell, Chief Metallurgist, Reynolds Metals, Phoenix; Membership Chairman, E. J. Schwantes, U. S. Air Force Production Specialist, Phoenix; and Arrangement Chairman, John R. Rizley, Partner, Vernon Tool Co.

Danse at Detroit University Night

L. A. Danse, General Motors Corp., Left, Is Congratulated by O. W. McMullan, Chapter Chairman, After His Speech "Development of Materials and Processes" Before the Detroit Chapter in March

Reported by T. J. Phillips
Alloy Steels Inc.

"Development of Materials and Processes" was the subject of a talk presented by L. A. Danse, supervisor, Material and Processes Production Engineering Section, General Motors Corp., to the Detroit Chapter A.S.M. on March 10.

Mr. Danse, a Presidential appointee to represent industry on the Federal Water Pollution Control Advisory Board, opened the evening with a colored movie depicting the serious water problem in this country and the steps being taken to remedy the situation.

The speaker then traced the standards activities in the General Motors Corp. since its inception in 1911 when Arthur Little, Inc., was commissioned by James J. Storrow, then president of G.M., to organize a branch laboratory in Detroit to take care of the company's needs. Mr. Danse explained that the function of G.M.'s Metallurgical Committee is to gather, sift, and distribute information, and he cited examples illustrating the benefits derived from this program.

Directing his talk to the 43 metallurgical students from five local universities who were guests at the Chapter's first "University Night", Mr. Danse stressed the need for good metallurgical reports which can be understood by the shopman. The four cardinal principles of a report are accuracy, brevity, clarity, and conciseness, he pointed out.

W. R. Ginman, district manager for Ohio Crankshaft Co., and technical chairman, conducted an active question and answer period following Mr. Danse's talk.

Charles A. Nagler, associate professor of metallurgical engineering at Wayne University, presented the coffee talk at the dinner preceding the meeting, honoring over 75 A.S.M. sustaining members. He traced the growth of the University and discussed statistics showing how engineering has kept pace with the University's progress.

Washington Hears French Give Burgess Memorial Lecture

Herbert J. French, vice-president, International Nickel Co., Inc., traced the changes in the metallurgical pattern of engineering alloy steels and their history over the past 50 years, while presenting the Burgess Memorial Lecture before the February meeting of the Washington, D. C. Chapter A.S.M. The Burgess Memorial Award Lectures were inaugurated in honor of George Kimball Burgess, formerly director, National Bureau of Standards, Washington.

Mr. French defined the subject of his talk, "Engineering Alloy Steels", as those steels which owe their properties to the presence of one or more special elements or to the presence of greater than usual proportions of elements, such as manganese or silicon, normally present in plain carbon steels. Alloy constructional steels are utilized in parts of structures, machinery or processing equipment. In addition to providing higher strength per unit of weight (or bulk), without impairment of safety, they may offer resistance to fatigue, corrosion, wear, the weakening effects of elevated temperatures, or the embrittling effects of subatmospheric temperatures.

It was during World War II that the so-called National Emergency steels were developed, Mr. French stated. Those containing nickel, chromium, and molybdenum have become standard for peacetime production and are in current use. As a result of the present Korean conflict, problems of conservation are once more before us. Currently, a significant development is the broader use of boron to permit lowering of other alloys in steels, he said.

Our mastery over the mechanical properties of steels is relatively great, and different alloy combinations and treatments often can be used.

Our ability to combat corrosion, abrasion and the effects of subatmospheric or elevated temperatures is more restricted, while some properties, notably the elastic modulus of steels at ordinary temperatures, cannot be controlled at all.

M. I. T. Offers Summer Courses

New developments in two phases of metallurgy will be reviewed in special courses in Surface Reactions in Flotation, and in Chemistry and Mechanics of Molding Materials, to be given at the Massachusetts Institute of Technology during the summer of 1952.

The special course in Surface Reactions in Flotation, to be given from June 9 to 13, will emphasize interpretation and coordination of recent data in the light of sound chemical principles. The course will be under the joint direction of H. R. Spedden and P. D. de Bruyn, professors at the Richards Mineral Laboratory at M.I.T.

The special program in Chemistry and Mechanics of Molding Materials will be given from Sept. 1 to 6 under the direction of H. F. Taylor, professor in the department of metallurgy. The program is designed to provide a fundamental appreciation of refractories and binders of both current and potential use in the foundry industry.

Since enrollment will be limited, early application is advisable. Requests for application forms or further information should be addressed to Dr. Ernest H. Huntress, Director of the Summer Session, Room 3-107, Massachusetts Institute of Technology, Cambridge 39, Mass.

Metals Stressed As Keystone of Atomic Development

Reported by L. McD. Schetky
Rensselaer Polytechnic Institute

"Metal as the Keystone of Atomic Power Development" was the subject of Albert R. Kaufmann's address before the Eastern New York Chapter A.S.M. on March 11. Dr. Kaufmann, director of the Atomic Energy Commission Metallurgical Project at Massachusetts Institute of Technology, stressed the role of the metallurgist in the future of atomic power, the need for new methods of evaluating metal characteristics in this highly specialized application, and the complex problems associated with reactor design and construction.

The metallurgist must be prepared to do research and development work in many fields if atomic power is to become commercially feasible, Dr. Kaufmann said. No longer does the choice of a material depend on its physical properties, but rather on such esoteric problems as the absorption cross section of the atom, metal solubility in liquid metal coolants, and modification of structure by neutron bombardment.

The actual atomic reactor is a compromise design taking into account the power output, choice of raw materials, the neutron source, the type of coolant, and other such interrelated factors. In any power-developing unit intended for commercial use, economy of operation is a main consideration. With this as a guiding factor, design resolves itself into selection of size, ranges of operating temperature, and the type of reaction expected.

The materials used inside the reactor must be chosen with regard for their atomic as well as strength or thermal characteristics. Since neutron flux is important in determining the fissioning, materials which absorb or modify this neutron flow will materially affect pile operation. The term "cross section of the atom" is used, this being a measure of the atom's ability to intercept neutrons. Na, Pb, Be, and Zr have low cross sections. The metallurgy of Be and Zr in particular needs further work. Ni, Fe, Va, and Cr have medium cross sections and may be utilized where absorption is not critical. The problem of producing these elements in a pure state, or in conditions meeting both the atomic and strength considerations, is a complex one.

Beryllium presents a good combination of these characteristics. In its present state it is costly and quite brittle and, though powder metallurgy has improved this latter fault to a great extent, much work still remains to be done.

The actual fuel used in the pile may be supplied as a solid within a container, or as a continuously flowing slurry. With solid fuel the heat must be transferred through the walls of the container to heat the coolant. Containers for fuel must withstand high thermal stresses. The jacket must have high conductivity and low reactivity. At the upper temperatures of operation even water is very reactive, and aluminum and magnesium used as jackets fail under erosion and reaction. Even Zr has failed in this use, though the development of higher purity Zr has helped.

Coolant may be gas (in aircraft power piles), or water (in stationary units), or even liquid metals. Work with molten sodium and eutectics of sodium and potassium has been carried out, but problems of solution of the metals in these liquid coolants still exist.

Extent of radiation damage to materials within the pile is questionable. The effect for metals is in the same direction as that of cold work. It is felt that the rate at which the damage occurs may be of more importance than the actual time of exposure.

Dr. Kaufmann closed his talk with a presentation of many miscellaneous problems such as high-temperature oxidation of molybdenum, the production and welding of extremely thin-walled tubing, forming porosity-free welds in aluminum, making magnesium with high corrosion resistance, and producing high-density graphite.

Psychology Takes Over at Canton-Massillon Meeting

Reported by Wells E. Ellis
Research Metallurgist
Timken Roller Bearing Co.

Sustaining members were honored at the February dinner meeting of the Canton-Massillon Chapter A.S.M. After dinner, Blake Crider, chairman of the department of psychology, Fenn College, presented an informal lecture on the subject of "Human Relations".

Most of the everyday problems facing the metal industry, such as steel shortages, substitute steels, and distortion, were forgotten for at least 60 minutes. During this "lost hour" a group of engineers struggled with such topics as the definition of an emotion, fear, love, and psychoneurosis. The meeting was acclaimed to be a success by all present.

Georgia Course Is on Shop Level Metallurgy

Reported by Richard L. Priess
Associate Editor
Southern Power and Industry

Shop level personnel through top management attended a four-session course on "Shop Level Metallurgy", the first of two educational functions to be sponsored by the Georgia Chapter A.S.M. this year.

The course, designed to give basic information on metalworking and the principles that apply to most operations pertinent to industrial plants in the Atlanta area, is being offered to all personnel of metalworking plants, whether A.S.M. members or not, to aid in the defense effort.

Response was so great that the S.R.O. sign went up in advance of the opening session, March 10.

Because of the exceptional interest shown, the course is being repeated in April for more than 150 men from Lockheed Aircraft's Marietta (Ga.) plant.

Dr. Robert J. Raudebaugh, professor of metallurgy at Georgia Institute of Technology, conducted both courses.

A S.R.O. Sign Went Up Well in Advance of the First in a Series of Four Educational Lectures Presented for the Man in the Shop Entitled "Shop Level Metallurgy". The course was presented by the Georgia Chapter A.S.M. Pictured above is a portion of the large audience attending the first meeting in March

(*Continued from p. 7*)

interest to its members, regardless of whether they are practical or fundamental in nature. It does not discriminate against descriptions of equipment and commercial processes, and apparently makes no stipulation that the material abstracted be new or beyond the elementary grade.

A.S.M. Review likewise imposes no restrictions from the standpoint of selectivity. On the contrary, its aim is to provide as broad a coverage as possible so as to include even the briefest notes that may be of interest to the practical metallurgist; about its only limitation applies to the material contained in the "new products" sections of the more popular magazines and to some published discussions of minor importance. Correspondence and notes are generally included.

Thus, the factor of selectivity will account for the fact that much of the coverage of *A.S.M. Review* is not duplicated by *Chemical Abstracts* and *Metallurgical Abstracts.*

Source Material

In addition to the periodical literature that constitutes the bulk of any abstract journal, all of the four services cover a number of miscellaneous bulletins, bibliographies, government publications, and documents. Books are annotated in *A.S.M. Review,* reviewed by *Metallurgical Abstracts* and the Iron and Steel Institute, and listed by title only in *Chemical Abstracts* (except for occasional books that contain *new* chemical information, which may be abstracted). Patents are covered only in *Chemical Abstracts,* patents of principal industrial countries being included.

Extent of the title list of periodicals varies considerably among the four services. *Chemical Abstracts'* list of 4300 journals is not broken down by subject; however, with this large number and its broad fields of interest, it is to be expected that its metallurgical coverage would be most comprehensive—at least as concerns literature with a chemical interest. *Chemical Abstracts'* "List of Periodicals Abstracted" is published at five-year intervals. It gives information on addresses, frequency of publication, subscription price, and a key to library files.

An extremely wide coverage is also provided by *Metallurgical Abstracts,* which surveys some 1500 periodicals (for an annual production of 6000 abstracts). The list includes many journals of irregular publication and borderline interest. It contains journals on medical matters and industrial psychology, and journals in the dairy, brewing, and other industries using nonferrous metals. Publications of similar societies and universities throughout the world in which something of importance *might* conceivably be published, but in which material for abstracting is seldom found, are also searched.

The Iron and Steel Institute, with an annual output of about 4000 abstracts, has a periodical list of some 690 titles. The only information given other than the title is the city in which the publication originates.

Finally, *A.S.M. Review,* with an output of 8000 to 10,000 abstracts, lists only about 550 publications. The list is published annually in the oound volume of the *Review of Metal Literature* and reprints are available.

The *A.S.M. Review* list includes *only* the publications from which articles have been abstracted during the calendar year, and does not include all of the ones that were searched. Thus, it shows a considerable amount of variation from year to year, and a compilation of the list for several years (to include all of the borderline titles yielding perhaps one reference in two or three years), would show that the figure for journals searched is closer to 800.

Another reason for the briefness of the list is related to the comparative youth of the publication (*A.S.M. Review* was established in 1944, *Chemical Abstracts* in 1907, *Metallurgical Abstracts* in 1909, and the Iron and Steel Institute's abstracting service in 1871). Much has been done to build up the list since the war, particularly in the foreign language field.

Subject Matter

General statements concerning the subject matter covered by each of the four services were obtained from the respective editors. These statements have been augmented by specific statistical data.

Chemical Abstracts interprets "chemical or chemical engineering" interest in a reasonably broad manner. Since most of the practical aspects of plant operation have to do more with mechanical metallurgy than chemical metallurgy, little is included in this field. For instance, articles on heat treatment, welding and mechanical working are bypassed unless some chemical changes or other chemical effect or relation is involved.

Thus, in Table 6,* *Chemical Abstracts* shows good coverage of the fields of ores and raw materials, smelting and refining, metallography, corrosion, electroplating, and analysis. Its coverage of the properties of metals is affected by the fact that mechanical properties are largely disregarded. It passes by many papers in the fields of cleaning and finishing, mechanical testing and inspection, foundry practice, heat treatment, mechanical working and welding—metallurgical subjects of but slight chemical interest.

Metallurgical Abstracts covers all fields of metallurgy except mining, extraction, and ferrous metallurgy. Material is selected on the basis of whether it is likely to be of any value to a professional metallurgist engaged in the field of general and nonferrous metallurgy, to any scientist carrying out investigations on the constitution and properties of metallic materials, or to qualified persons whose concern is the application of metals to industrial and other uses.

The Iron and Steel Institute abstracts material concerned with all aspects of the making, shaping, treatment, properties and uses of iron and steel, beginning with the mined iron ore (exclusive of actual mining) and covering the manufacture and properties of metallurgical coke and the properties and behavior of refractory materials. Also, ancillary subjects such as physics and engineering are included to the extent useful or necessary to understanding of the main subjects.

The British journals taken together have poorest duplication of coverage in the fields of cleaning and finishing, inspection, mechanical working, machining, welding and design; it should be borne in mind, however, that these percentages may be affected by the matter of selectivity discussed above. The best percentage of coverage is to be found in the fields of smelting and refining, properties, metallography, corrosion, electroplating, laboratory and mechanical testing, analysis, foundry, and furnaces and fuels. (The poor figure for ores and raw materials is explained by the fact that *Metallurgical Abstracts* does not cover this subdivision for nonferrous metals.)

A.S.M. Review attempts to cover all aspects of metallurgy, including production, fabrication, properties, testing, inspection and use of metals. The percentages showing duplication of coverage by the other journals would indicate that this aim is being achieved. *A.S.M. Review* goes farther perhaps than the other journals in covering the practical or operating aspects of metallurgy, not only from the standpoint of selectivity, discussed above, but also from its coverage of such fields as welding and metal working.

In the predominantly nonferrous field, *A.S.M. Review* (as compared to *Metallurgical Abstracts*) has poorest coverage of properties, analysis, and laboratory and mechanical testing. However, the titles of the missing abstracts indicated articles that would have stronger appeal to a chemist or physicist than to a metallurgist—for example, "Kinetics of the Reaction Between Copper and Iodine in Various Solutions" and "Ultraviolet Bands of Sodium".

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*Tables 6, 7 and 8, reproduced in the original paper, consisted of a subject analysis with comparative figures indicating the amount of coverage given by each of the services to 26 subdivisions of the metallurgical field. Since one of the British journals covers primarily ferrous and the other primarily nonferrous metallurgy, their coverage was combined into a single set of figures.

In the ferrous field the Iron and Steel Institute is seen to cover several subjects that are neglected in *A.S.M. Review,* such as fuels, refractories technology (without reference to metallurgical application), machinery for the iron and steel plant, lubrication (of machinery), and historical aspects. *A.S.M. Review's* coverage of blast furnace practice and actual steelmaking operations closely duplicates that of the British; likewise the mechanical working, heat treating and finishing operations.

It was not possible to check the subject coverage of *A.S.M. Review* against *Chemical Abstracts* because of the lack of subdivision in the metallurgical field for the latter journal. However, as would be expected, omissions were largely of a chemical or pathological nature; a typical title of an article abstracted in *Chemical Abstracts* but not in *A.S.M. Review* is "Bronchopneumonia and the Production of Ferromanganese".

Summary

The peculiar characteristics of each of the four abstracting services can now be summarized by considering each one in turn.

A.S.M. Review differs from the other three in an important fundamental. Unlike the others, its original purpose was not to serve primarily as a research or library tool; rather it is intended to give the busy man (the practical metallurgist, executive or shopman as well as the research worker) an opportunity to glance through its classified sections and determine what articles in the literature published during the preceding month he ought to read in order to keep up to date in his field.

For this purpose the indicative rather than the informative type of abstract is best suited. Furthermore, the indicative "annotation", prepared by a staff of abstractors rather than by outside specialists, is the only type that will meet the prompt publication schedule demanded.

Furthermore, to fulfill this purpose, broad coverage of the metallurgical field is also essential—not only from the standpoint of subject but also the type of material abstracted. For example, a brief commercially slanted description of a minor proprietary finishing operation may have little lasting value to the research worker some years hence, yet it may be just what the practical metallurgist is looking for today.

This should not be construed as meaning that *A.S.M. Review* is useful only to the practical metallurgist; its aim rather is to give *complete* coverage of all literature on metals, even the most abstruse data appealing to the theoretician and researcher. The only exception to this coverage exists in borderline publications whose relationship to metallurgy is extremely remote; such material should be sought in the other three journals. It should also be pointed out that *A.S.M. Review* is the only existing abstracting service that provides this complete coverage of metallurgy in one source.

The principal distinguishing features of *Metallurgical Abstracts* are that its abstracts are not only informative, but are sometimes critical; it is selective to the extent of omitting certain types of elementary or "popular" articles; and its range of coverage is very broad, extending considerably into chemistry, physics, medicine, and other borderline fields. It is the least timely of the four services—a lag of a year or more was frequently noted in checking the abstracts in this survey.

In subject matter it is not confined to references dealing specifically with the nonferrous metals, but includes all general metallurgy as well, excluding only material that is limited to ferrous interest. Otherwise, subject coverage is fairly complete, with the exception of mining and extractive metallurgy.

The outstanding feature of the Iron and Steel Institute abstracts is their coverage of certain subjects not found in any of the others. Fuel resources, fuels technology, and use of fuels—either in the actual steelmaking operations or in the power plant —are covered. Electrical machinery and all types of heavy equipment for the steel plant and the power house are included, as well as literature on the lubrication of this machinery. Coverage of the secondary fabricating operations such as press operations, machining and welding, on the other hand, is less complete than in *A.S.M. Review.*

Iron and Steel abstracts may be either informative or indicative, and the service is not selective, including much on practical aspects of plant operation. Promptness of publication is fair only, and range of material abstracted is quite broad. As would be expected, a certain amount of overlapping of interest exists between the two British journals.

Chemical Abstracts as a source of metallurgical information is characterized by the virtual exclusion of mechanical metallurgy. Although the interpretation of chemistry is broad, this limitation is reflected in the dearth of literature references on mechanical properties and testing, heat treatment, welding, and plant operations generally. Likewise, it is selective to the extent of specifying *new* information and omitting rehashes and elementary presentations.

It is the only one of the four to include patents, and its range of material searched is broad. The abstracts are more informative than any of the other services, and it maintains a relatively good record in promptness of publication—second only to *A.S.M. Review.*

One facet of abstract services that is of paramount importance to the librarian but has been omitted from this survey is the quality of indexing. It has been truly stated that a reference book is only as good as its index, and doubtless a separate statistical survey carried out along the same lines as that described above would help the index users.

Quality of indexing of *Chemical Abstracts* is well known for its excellence. The editors pride themselves on this feature; abstracts are written with a view to including everything in the original article that is indexable, and for every 1000 words published in the abstracts 650 words of indexing are written.

The quantity of indexing provided for a particular literature reference is necessarily in direct proportion to the amount of information contained

(*Continued on p.* 14)

Discusses Future of Jet Propelled Planes

Speaking on "Jet Propulsion" Before the March Meeting of Worcester Chapter, S. F. Richardson, General Electric Co., Predicted That, Barring All-Out War, Commercial Jet-Propelled Planes Will Be Roaring Across the U. S. Within Five Years. "We are on the threshold of the 'Buck Rogers' era", he said. Shown are: Leo P. Tarasov, Norton Co., and Robert S. Morrow, George F. Blake, Inc., both past chairmen; Stephen M. Jablonski, Wyman-Gordon Co., technical chairman; Harold J. Elmendorf, American Steel & Wire Co., executive committee member; Mr. Richardson; Joseph C. Danec, Norton Co., educational chairman; Wendell J. Johnson, Massachusetts Steel Treating Corp., program chairman; and Lincoln G. Shaw, secretary-treasurer. (Reported by C. Weston Russell)

(*Continued from p.* 13)

in the abstract, and it is natural to assume that the services providing the informative type of abstract will also provide the most thorough indexing.

Therefore, if the problem confronting the librarian concerns the location of a specific fact in a minor portion of the subject field, he would do best to look for it in the indexes of *Chemical Abstracts* and the British journals. On the other hand, if he wishes to compile a substantial amount of information on a broad phase of the subject, he is likely to find a more complete selection of literature references through the indexes of *A.S.M. Review*. Again, if the information wanted concerns a new and important development, a matter of theoretical interest or fundamental research, time can be saved by using the more selective services which weed out the popular or "pot-boiling" articles.

Finally, in the matter of indexing, *A.S.M. Review* adopted a new plan in 1950 which is in keeping with its policy of serving the practical metallurgist, but which should also be of considerable interest to the librarian. This is the adoption of code symbols at the end of each annotation to indicate the main subjects covered in the reference. These code symbols refer to the ASM-SLA Metallurgical Literature Classification. Their inclusion in *A.S.M. Review* makes it possible to assign to a clerk or other untrained personnel the task of looking through each monthly issue and selecting the literature that falls in any specific field of interest.

Atomic Energy Conference To Be Sponsored by M.S.C.

Michigan State College is offering a conference on "Atomic Energy and the Future", May 20-21, 1952, to introduce knowledge in the field of nuclear energy to professional people in the area. Engineers, engineering and science teachers, executives from industry, technicians, men from the public health and civil defense fields, and other interested persons have been invited to attend.

The conference will include fundamentals and applications of atomic energy in industry. Although many persons expected to attend are not actively engaged in any phase of nuclear energy, it is hoped that through this conference they may recognize the opportunities of the future in this field.

The conference is being sponsored by the departments of mechanical engineering and the continuing education service, in cooperation with several participating organizations. Speakers selected are specialists in the topics assigned. Emphasis of the program is being placed on the uses of nuclear energy in industry and for power generation.

Should this conference prove successful, as measured by attendance and satisfaction to those attending, it may become an annual affair, to serve as a clearing house on nuclear fundamentals and recent industrial developments in the Michigan area.

A registration fee of $10 has been set to cover expenses. For further information, contact D. J. Renwick, Conference Program Chairman of the Mechanical Engineering Department, or Stanfield Wells of the Continuing Education Service, Michigan State College, East Lansing, Mich.

Floyd E. Harris Appointed Board Member by Dow

Floyd E. Harris, a frequent contributor to *Metal Progress* and the A.S.M. Metals Handbook, has been appointed a member of the board and chief research consultant of the Dow Furnace Co.

Floyd E. Harris

Mr. Harris has recently retired from his position of furnace engineer at the Buick Division of General Motors Corp., where he had worked for over 35 years. In that capacity he had become an authority on furnaces and the heat treatment of steels.

At the Dow Furnace Co., Mr. Harris expects to expand the uses of batch-type controlled atmosphere furnaces.

Mr. Harris is an active member of the A.S.M. and the American Institute of Mining and Metallurgical Engineers. For many years he has contributed papers on controlled atmosphere heat treating and furnaces to A.S.M. and other publications.

Schedule Set for ASM Interchapter Meeting

An outline of the program of the Eighth Biennial A. S. M. Interchapter Meeting to be held at Pennsylvania State College June 20-21, is as follows:

June 20—10:30 a.m. Opening address on "Metals and Metallurgy of the Future", to be given by Zay Jeffries.

2:00 p.m. **Session on Conservation of Metals.** James R. Long of the Metallurgical Advisory Board, National Research Council, chairman. Speakers: John D. Morgan, Jr., director, Materials Review Division, Defense Production Administration; B. S. Mesick, commanding officer, Watertown Arsenal; and O. C. Ralston, chief metallurgist, U. S. Department of the Interior, Bureau of Mines.

2:00 p.m. Session on **Relating Laboratory Tests to Service Conditions.** Samuel Epstein, research engineer, Bethlehem Steel Co., and Wm. T. Lankford, research assistant, U. S. Steel Co., co-chairmen. Speakers: Howard Scott, manager, metallurgical and ceramic department, Westinghouse Electric Corp.; Frank Tatnall, manager, testing research, Baldwin Locomotive Works; and I. V. Williams, Bell Telephone Laboratories.

June 21—9:30 a.m. Session on **Recent Advances in Steelmaking Practice.** John Marsh, research engineer, Bethlehem Steel Co., chairman. Speakers: Walter Crafts, chief metallurgist, Union Carbide and Carbon Corp., Electromet Division; and D. J. Girardi, metallurgical engineer, Timken Roller Bearing Co., Steel & Tube Division.

9:30 a.m. Session on **Metallurgical Aspects of Casting.** Howard Taylor, associate professor, department of metallurgy, Massachusetts Institute of Technology, chairman.

Wilson at Calumet Officers' Night

National Officers' Night During the February Meeting of the Calumet Chapter Featured Ralph Wilson (Center), Timken Roller Bearing Co. and Vice-President A.S.M., Who Spoke on "Spectroscopy of Iron and Steel". Shown with Mr. Wilson are, from left, J. Rassenfoss, American Steel Foundry, program chairman; W. Shirley, U. S. Reduction Co., technical chairman; Mr. Wilson; J. R. Bateman, Standard Forgings Corp., vice-chairman; and W. Hintalla, U. S. Steel Co., chapter treasurer. (Reported by J. R. Bateman, Standard Forgings Corp.)

Commercial Possibilities Of Titanium Discussed At New Haven Meeting

Reported by Earle W. Lovering
Metallurgist, Seymour Mfg. Co.

In four years titanium has grown from a laboratory curiosity to a commercial metal, according to Howard T. Clark, group leader, physical metallurgy research, Rem-Crum Titanium, Inc., who addressed over 200 members at the March meeting of the New Haven Chapter A.S.M.

In 1948, when titanium was first put on the market, 2½ tons were produced; in 1950, about 700 tons were produced; and in 1952, perhaps 2000 tons will be produced.

The combination of high strength, excellent corrosion resistance, and lightness of titanium makes it particularly desirable for certain applications. At the present time, it is confined largely to aircraft and military applications. Dr. Clark illustrated various aircraft parts operating at from 300 to 1000° F. A base plate of an 81-mm. mortar made of steel weighed 48 lb., and only 24 lb. when titanium was used.

Dr. Clark presented data summarizing the physical properties of titanium and titanium-base alloys, as well as special corrosion resistance data under various conditions. He made many recommendations on machining and fabricating of titanium.

The current price of titanium sponge is about $5 a lb., about $12 a lb. for simple forgings, and as much as $25 a lb. for sheet under some conditions. While these prices may come down, titanium will probably never be a common metal like iron because of two inherent difficulties; it is very hard to melt because of its great affinity for oxygen, nitrogen and carbon; and, it is hard to fabricate, as compared to aluminum or brass. Nevertheless, for many applications it is the best possible metal and its uses are increasing rapidly.

A.S.M.-S.A.E. Chapters Hold Joint Meeting in B.C.

Reported by Walter J. Chappell
Vivian Engine Works, Ltd.

A joint meeting of the British Columbia Chapters A.S.M. and S.A.E. was held in Vancouver on March 6. The guest speaker, N. E. Hendrickson, United States Spring & Bumper Co., Los Angeles, spoke on "New Steel Concepts for Modern Transportation".

Mr. Hendrickson discussed the early attempts at making good steels, usually by trial-and-error methods, and the crude methods of heat treating for greater strength and endurance. The famous Damascus swords were examples of the skill of these early craftsmen. Since that time, scientific knowledge has greatly improved our methods of steelmaking, though in some respects the surface has still only been scratched.

The fundamental principles of hardenability of steel, and the functions of alloys in improving hardenability were pointed out by the speaker. He explained how boron-treated steels of comparatively small alloy content have become efficient substitutes for the rich alloy steels no longer obtainable because of the shortages of nickel, chromium, and molybdenum.

The coffee speaker for the evening, Bud Trout, S.A.E. chairman, gave a brief talk entitled "Around the Corner", outlying the founding of the S.A.E. by men who believed that such an organization was needed to cope with standardization as we know it.

Titanium Company Formed

The Christiansen Corp., Chicago, producer of aluminum and magnesium alloy ingot and other foundry products, has announced the formation of a wholly-owned subsidiary named the Titanium Co. of America. This corporation, chartered in Delaware, plans to construct facilities to manufacture wrought products for industrial and military markets from titanium. The new plant will probably be located in East Chicago.

Tool Steel from Ryerson
Easier to Buy . . . Safer to Use

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IMPORTANT MEETINGS

For June

June 1-6 — Society of Automotive Engineers. Summer Meeting. Ambassador & Ritz-Carlton, Atlantic City, N. J. (John A. C. Warner, Secretary and General Manager, SAE, 29 West 39th St., New York 18, N. Y.)

June 2-4—American Gear Manufacturers Association. Annual Meeting. The Homestead, Hot Springs, Va. (John C. Sears, Executive Secretary, A.G.M.A., Empire Bldg., Pittsburgh 22, Pa.)

June 5-7 — Electric Metal Makers Guild, Inc. Annual Meeting. French Lick Springs Hotel, French Lick, Ind. (C. B. Williams, Secretary, E.M.M.G., Box 6026, Mt. Washington Sta. (11), Pittsburgh, Pa.)

June 9-21—American Standards Association. Standardization Meeting in Conjunction With the Second Triennial General Assembly of the 33-Nation International Organization for Standardization. Columbia University, New York City. (George F. Hussey, Jr., Managing Director and Secretary, A.S.A., 70 East 45th St., New York 17, N. Y.)

June 13—The Wire Association. Pacific Coast Regional Meeting. Biltmore Hotel, Los Angeles, Calif. (Richard E. Brown, Secretary, W. A., 453 Main St., Stamford, Conn.)

June 15-19—American Society of Mechanical Engineers. Semi-Annual Meeting. Sheraton Gibson Hotel, Cincinnati, Ohio. (C. E. Davies, Secretary, A.S.M.E., 29 West 39th St., New York 18, N. Y.)

June 16-17—Malleable Founders' Society. Annual Meeting. The Homestead, Hot Springs, Va. (L. D. Ryan, Managing Director, M.F.S., 1800 Union Commerce Bldg., Cleveland 14, Ohio)

June 16-20—American Electroplaters' Society. Annual Convention and 1952 Industrial Finishing Exposition. Stevens Hotel and International Amphitheatre, Chicago, Ill. (D. Gardner Foulke, Executive Secretary, A.E.S., P. O. Box 168, Jenkintown, Pa.)

June 16-20 — American Crystallographic Association. Summer Meeting. Camp Tamiment, Tamiment, Pa. (H. T. Evans, Jr., Secretary, A.C.A., Phillipps Laboratories, Irvington-on-Hudson, N. Y.)

June 19-20—American Management Association, Inc. General Management Conference. Waldorf-Astoria Hotel, New York City. (James O. Rice, Secretary, AMA, 330 West 42nd St., New York 18, N. Y.)

June 23-27 — American Institute of Electrical Engineers. Annual Summer Meeting. Hotel Nicollet, Minneapolis, Minn. (H. H. Henline, Secretary, A.I.E.E., 33 West 39th St., New York 18, N. Y.)

June 23-27 — American Society for Testing Materials. Fiftieth Anniversary Meeting. Hotel Statler, New York City. (R. J. Painter, Assistant Secretary, A.S.T.M. 1916 Race St., Philadelphia 3, Pa.)

Lectures on High-Alloy Castings

Reported by Frank H. Page

Process Engineer, Rohr Aircraft Corp.

Problems encountered in melting specialized alloys to meet aircraft requirements, basic techniques in melting practices and alloying methods, and handling of sand molds and shell molding, were discussed by W. H. Dunn, superintendent of Solar Aircraft Co.'s stainless steel foundry, before the February meeting of the San Diego Chapter A.S.M.

Induction furnace melting, Mr. Dunn stated, offers constructive advantages over arc melting, particularly in the high alloys. No alloys are lost in the melt-down with consequent conservation of strategic materials. Remelts of stainless scrap, for example, can be accomplished with close chemical and metallurgical control to known analyses with minimum losses.

Referring to his own experience in Solar's foundry, Mr. Dunn said: "Hydrogen gas is a big problem in high-alloy melts. We use baked sand molds rather than green sand. They cost a little more but where it is paramount to meet high quality, as in exacting aircraft specifications, they are a definite advantage."

Mr. Dunn went on to say that Solar maintains elaborate inspection procedures through every step of the operation from mixing the sand to shipment of the final casting. The company keeps permanent records on each casting, checking out each step along the way.

W. H. Dunn, Superintendent of Solar Aircraft Co.'s New Stainless Steel Foundry, Watches Application of Refractory Core Wash to Baked Sand Molds For Use in B-36 Aircraft Exhaust System

The need for better engineering in the design of castings, more dissemination of information between foundries, and increased research and development work were stressed.

Worcester Gives Course For the Man in the Shop

Reported by Joseph C. Danec

Norton Abrasive Co.

The Worcester Chapter A.S.M. sponsored a series of three educational lectures, April 21 and 28, and May 5, designed especially for "The Man in the Shop". The course was given at the Worcester Memorial Auditorium, and covered the following subjects:

April 21—*How Steel Is Made,* by Charles M. Kay, Superintendent, Steel Works, American Steel and Wire Co.

April 28—*How Steel is Heat Treated,* by Arthur L. Stowe, Plant Metallurgist, Massachusetts Steel Treating Corp.

May 5—*How Steel Is Tested,* by Carl G. Bergstrom, Metallurgist, Wyman-Gordon Co.

Discussion periods after each talk allowed those attending to question the speakers about particular parts of the program they had presented.

Adds Steel Warehouse

The Ziv Steel & Wire Co. has announced the opening of a new tool-steel warehouse in Toledo, Ohio. This new branch will stock a complete line of tool and die steels. William P. Stead has been appointed manager.

Powder Metallurgy Seminar To Be Held in Austria

Paul Schwarzkopf, president of the American Electro Metal Corp., Yonkers, N. Y., and owner of the Metallwerk Plansee, Reutte, Tyrol, invites his colleagues and all friends of powder metallurgy to attend the First Plansee Seminar "De re metallica", to take place June 22-26, 1952, in Reutte, Austria.

The Seminar is under the auspices of Walter J. Donnelly, U. S. High Commissioner for Austria; Dr. Ernst Kolb, Austrian Minister of Education; Dr. Eduard Reut Nicolussi, Rector of the University of Innsbruck; and representatives of the Tyrolean government.

The tentative program includes lectures by several American scientists, including the following: G. J. Comstock, Stevens Institute of Technology, Hoboken, N. J.; V. D. Frechette, Alfred University, Alfred, N. Y.; H. H. Hausner, Sylvania Electric Products, Inc., Bayside, N. Y.; and J. T. Norton and J. Wulff, both of Massachusetts Institute of Technology, Cambridge, Mass.

Further information about this Seminar may be obtained by writing directly to: Dr. W. Leszynski (Representative in the U. S.), *Powder Metallurgy Bulletin,* 320 Yonkers Ave., Yonkers 2, N. Y.

A. S. M. Review of Current Metal Literature

An Annotated Survey of Engineering, Scientific and Industrial Journals and Books Here and Abroad, Received During the Past Month

Prepared in the Library of Battelle Memorial Institute, Columbus, Ohio

W. W. Howell, Technical Abstractor

Assisted by Janet Motyka, Maxine Runkle and Members of the Translation Group

A GENERAL METALLURGICAL

134-A. How to Stimulate Production of Base Metals in the Americas. Charles Will Wright and Lester G. Morrell. *Engineering and Mining Journal,* v. 153, Mar. 1952, p. 80-83.

Surveys world production and consumption of Cu, Pb, and Zn. The supply situation in the U. S. and the Americas. Data are graphed. (A4, B10, Cu, Pb, Zn)

135-A. Steel Industry. Richard D. Hoak. *Industrial and Engineering Chemistry,* v. 44, Mar. 1952, p. 513-520.

An outline of waste disposal and utilization practices in the steel industry. 25 ref. (A8, ST)

136-A. Brass and Copper Industry. F. X. McGarvey, R. E. Tenhoor, and R. P. Nevers. *Industrial and Engineering Chemistry,* v. 44, Mar. 1952, p. 534-541.

Recent studies on typical mill rinses have shown that cation exchangers operating in the sodium or hydrogen cycle might be employed successfully to concentrate Cu, Zn, and Cr solutions. The economics of the exchange in the hydrogen cycle indicate that profitable recovery of Cu might be accomplished in conjunction with an electrodeposition process in the Cu pickle itself. Flow rate and influent concentration have a marked effect on the economics of the process. Tables and graphs. 15 ref. (A8, Cu)

137-A. Sulfuric Acid Recovery From Waste Liquors. F. J. Bartholomew. *Industrial and Engineering Chemistry,* v. 44, Mar. 1952, p. 541-545.

A practical method for recovering H_2SO_4 from steel-mill and titanium-pigment-plant solutions by concentrating the free acid, removing the iron sulfate by salting out, and then decomposing the sulfate for recovery of its acid values. A new method of supplying heat to concentrate the liquor improves fuel efficiency and makes the recovery possibilities somewhat more attractive. The economic aspects of these problems are stressed. (A8)

138-A. High Purity Spongelike Copper From Waste Pickling Sludge. Robert L. Rusher and George W. Blum. *Industrial and Engineering Chemistry,* v. 44, Mar. 1952, p. 660-664.

The material prepared from the brass and Cu products industry, shows evidence of possessing extremely large surface and high chemical activity. Photomicrographs. 14 ref. (A8, Cu)

139-A. Pigment Grade Iron Oxides; Recovery From Iron-Containing Waste Liquors. C. C. DeWitt, M. D. Livingood, and K. G. Miller. *Industrial and Engineering Chemistry,* v. 44, Mar. 1952, p. 673-678.

Two pilot plants, adaptable to the production of various synthetic iron oxides from iron-containing solutions such as waste pickle liquors. Data are tabulated. 26 ref. (A8, Fe)

140-A. Industrial Wastes. Harold R. Murdock. *Industrial and Engineering Chemistry,* v. 44, Mar. 1952, p. 105A-106A, 108A.

Surveys treating methods available for reducing cyanide waste solutions to harmless waste waters for disposal in streams. (A8)

141-A. Iron Ore in 1951. *Skillings' Mining Review,* v. 40, Mar. 15, 1952, p. 1-2.

Statistical summary of iron-ore production and shipments from the U. S. for 1951. (A4, Fe)

The coding symbols at the end of the abstracts refer to the ASM-SLA Metallurgical Literature Classification. For details write to the American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

142-A. 1951 L. S. Iron Ore Shipments by Mines. *Skillings' Mining Review,* v. 40, Mar. 22, 1952, p. 1-2.

Brief report of Lake Superior region iron ore shipments. (A4, Fe)

143-A. Rebirth of An Industry. Margot Shore. *Steelways,* v. 8, Mar. 1952, p. 28-29.

Industrial potentialities of France with respect to iron-ore reserves and steel production. (A4, B10, Fe, ST)

144-A. Nonferrous Metals in the Year 1951. (In German.) Heinrich Sennekamp. *Metall,* v. 6, Jan. 1952, p. 31-37.

Statistical data on production and consumption, of nonferrous metals in Germany in 1951. (A4, EG-a)

145-A. Development of the Light-Metal-Ware Industry in 1951. F. S. Behrens. (In German.) *Metall,* v. 6, Mar. 1952, p. 145-146.

A survey, giving some statistics, mainly for Germany. Includes Al foil, metal powders, sprayed parts, tubing, etc. (A4, Al)

146-A. The Aluminum Industry of Yugoslavia. (In German.) *Metall,* v. 6, Mar. 1952, p. 154.

Reviews latest development on the basis of the literature, such as the building of new plants and the enlargement of existing ones. Projected production. (A4, Al)

147-A. More Unsolved Problems; Additional Research Projects From ASTM Committees. *American Society for Testing Materials,* Feb. 1952, p. 19-20.

Unsolved problems, the present state of knowledge, questions to be answered, and introductory references. Problems include study of crack genesis and growth in steel. (A9)

148-A. Lone Star Steel Hitches Its Wagon to the Oil Industry. *Business Week,* Mar. 29, 1952, p. 64-66, 69.

Organization, financing, and layout of Texas company, most of whose steel is earmarked for the state's booming oil industry. (A5, ST)

149-A. Substitution for Strategic Metals in Steel Production. S. L. Gertsman. *Canadian Metals,* v. 15, Mar. 1952, p. 20, 22-23; Apr. 1, 1952, p. 24-25.

Deals specifically with present shortages of Ni, Mo, W, Co, Cb, and Mn and what to do about them. (A4, T general, AY)

150-A. Research Mission to Europe. Harold Vagtborg. *Chemical and Engineering News,* v. 30, Mar. 31, 1952, p. 1278-1281, 1338.

Tour was made by a group of administrators from U. S. research institutes to determine the means by which industrial research in each country visited might be encouraged, strengthened, and coordinated. (A9)

151-A. Regeneration of Sulphuric Acid in Waste Pickle Liquors. E. W. Mulcahy. *Industrial Chemist and Chemical Manufacturer,* v. 28, Mar. 1952, p. 125-129.

Methods employed in the metallurgical industry. Emphasizes ferrous and copper plant wastes. (A8, L12, Fe, Cu)

152-A. Effect of CaO:MgO Ratio in the Neutralization of Pickle Liquor. Francis J. Clauss and Lloyd E. Brownell. *Iron and Steel Engineer,* v. 29, Mar. 1952, p. 63-70.

A CaO:MgO ratio of about 96:4 gives best rates of filtration for neutralized slurry. Presents graphically the relationships between volume of filter cake, filtration rates, lime composition, and operating-pressure drop during filtration. (A8, L12)

153-A. Gold Scrap Recovery Methods Applicable to Scarce and Costly Materials. Bernard Blackman and Carl Heinzman. *Materials & Methods,* v. 35, Mar. 1952, p. 102-104.

Program of Keystone Watch Case Div., Riverside Metal Co. Applicability to other types of metalworking industries. (A8, Au, EG-c)

154-A. IMC Plays Vital Role in Offsetting Shortages of Materials Threatening Defense Production. Edmund E. Getzin. *Metals,* v. 22, Mar. 1952, p. 7-8, 17.

Refers to International Materials Conference, its role and accomplishments. (A4)

155-A. Canadian Copper, Lead and Zinc Prices in 1951 Chiefly Influenced by Prevailing U. S. Levels. Egmont Frankel. *Metals,* v. 22, Mar. 1952, p. 9, 17.

Review of the nonferrous metal business during 1951.
(A4, Cu, Pb, Zn)

156-A. The Aluminum Shortage is Ending! *Modern Metals,* v. 8, Mar. 1952, p. 41-44. (Based on talk by W. B. Griffin.)

Reviews new applications of Al and its alloys. Supply trends.
(A4, T general, Al)

157-A. The Zinc Situation. Wallace G. Woolf. *Western Miner,* v. 25, Mar. 1952, p. 35-37.

Properties and uses of Zn, industrial development, and government control. (A4, Zn)

158-A. Metallurgy. A. P. Wichmann. "Encyclopedia of Chemical Technology. Vol. 8" (Interscience Encyclopedia, New York), 1952, p. 934-944.

Divides the subject of metallurgy into two major parts, namely: extractive or production metallurgy, and adaptive or utilization metallurgy. Each is briefly discussed under several broad headings. (A general)

159-A. A Review of the War-Time Activities of the Newcastle Steel Plant of the Broken Hill Pty. Co. Ltd. and Its Associated and Subsidiary Industries. D. O. Morris. *Australasian Institute of Mining and Metallurgy, Proceedings,* new ser., Mar. 31-June 30, 1947, p. 69-139.

A detailed review of facts and figures. (A4, ST)

160-A. Stainless Foundry Pays Off Double. *Business Week,* Apr. 5, 1952, p. 100.

Stainless steel conservation at Solar Aircraft Co., San Diego, Calif., which installed a foundry to utilize its own scrap.
(A8, E general, SS)

161-A. What's Ahead for Steel? Kenneth S. Harris. *Canadian Metals,* v. 15, Apr. 1, 1952, p. 8-9.

A brief survey of the status of steel production and supply in Canada. Predicts 1,000,000-ton capacity increase by 1953. (A4, ST)

162-A. Scoreboard for Metals. H. McLeod. *Canadian Metals,* v. 15, Apr. 1, 1952, p. 10-12.

Latest official statistics on Canada's metalworking industries, for iron and steel production, nonferrous metals, and manufactured products. (A4)

163-A. Metalworking Facts and Figures. *Canadian Metals,* v. 15, Apr. 1, 1952, p. 14-20.

Annual issue of tabular information on every branch of the Canadian metalworking industries, compiled by Dominion Bureau of Statistics. (A4)

164-A. Sulphuric Acid and Liquid Sulphur Dioxide Manufactured From Smelter Gases at Copper Cliff, Ontario. R. W. Allgood. *Canadian Mining and Metallurgical Bulletin,* v. 45, Mar. 1952, p. 153-155; *Transactions of the Canadian Institute of Mining and Metallurgy,* v. 55, 1952, p. 123-125.

The general factors associated with the recovery of sulfur in smelter gases, in view of the current sulfur shortage. Flow sheets. (A8)

165-A. What Forces Affect Availability and Substitution of Materials? Franklin P. Huddle. *Electrical Manufacturing,* v. 49, Apr. 1952, p. 128-131, 312, 314, 316, 318, 320, 322, 324.

A discussion for the product design engineer. Such factors as international tensions, military planning, strategic geographic availability, and economic trends here and abroad. Includes a table of relative availability of selected basic materials. (A4, B10)

166-A. Recovery of Nickel & Zinc From Silver Refinery Waste Liquors. Part I. Recovery of Nickel by Electro-Deposition. N. G. Banerjee and T. Banerjee. *Journal of Scientific & Industrial Research,* v. 11B, Feb. 1952, p. 76-78.

Tables and graphs.
(A8, C23, Ni, Zn, Ag)

167-A. (Book) **Alcoa, an American Enterprise.** Charles C. Carr. 292 pages. Rinehart & Co., New York. $3.50.

History of Aluminum Co. of America from Charles Martin Hall's discovery of a cheap method of turning bauxite into aluminum by electrolysis to the present wide application of the metal. Pioneering days in the 1880's, the early struggles for patent rights, for financial backing, for consumer markets. (A2, Al)

168-A. (Book) **Applied Research in the United States.** Eugene W. Scott, Ed. 90 pages. 1952. National Academy of Sciences and National Research Council, Washington, D. C.

American practices in the organization, administration, and financing of applied research in natural sciences and engineering. Way in which new results found in the research laboratory are communicated to those responsible for their practical utilization. Directed mainly toward administrators of research in governments and industries of other countries. Appendix lists research and development facilities of U. S. Government departments and agencies. 45 ref. (A9)

169-A. (Book) **Case Study Data on Productivity and Factory Performance—Gray Iron Foundries.** 100+ pages. U. S. Dept. of Labor, Washington, D. C.

Statistical information based on a survey of 20 foundries. Includes tables on unit man-hour data, cupola operation and structure, pattern data, molding information, etc.
(A6, E11, CI)

170-A. (Book) **Hearings Before the Subcommitte on Study of Monopoly Power of the Committee on the Judiciary House of Representatives, Eighty-Second Congress, First Session. Serial No. 1. Part 1. Aluminum. Part 4. Mobilization Program.** 916 and 1060 pages. 1951. U. S. Government Printing Office, Washington.
(A6, Al)

171-A. (Book) **The National Research Council Review.** 285 pages. 1951. Council on Scientific and Industrial Research, Ottawa, Ont., Canada.

Brief introductory summary of organization and activities, detailed summaries of the activities of each division and subdivision, committee reports, administrative information, and staff directory. (A9)

172-A. (Book) **Notes on the Prehistoric Metallurgy of Copper and Bronze in the Old World.** H. H. Coghlan. 131 pages. 1951. Oxford University Press, Amen House, Warwick Sq., London EC. 4, England.

Native copper and the ores from which prehistoric nonferrous metals were obtained; analyses and metallography as means of distinguishing the various metals; mechanical properties of copper and bronze; the casting process: furnaces, bellows, and crucibles; methods of working the metals; results of metallurgical examination; examination of specimens from the Pitt Rivers Museum; bronze castings in ancient mounds; and related subjects. Includes 4-page bibliography, diagrams, photographs, and micrographs.
(A2, Cu)

173-A. (Book) **Scientific and Learned Societies of Great Britain.** Ed. 57. 227 pages. 1951. George Allen & Unwin, Ltd., 40 Museum St., London W. C. 1, England.

Part 1 deals with the organization of scientific research in Great Britain, and gives the names and addresses of the main research establishments administered by the Department of Scientific and Industrial Research, the Medical Research Council, the Agricultural Research Council, and the research associations. A chart shows the relationships which exist between bodies engaged in scientific research in Great Britain. Part 2 gives details of more than 600 societies in Great Britain, including objects and publications, membership subscriptions, meeting times, and principal officers. The societies are listed alphabetically, and are classified. (A9)

174-A. (Book) **The Story of Dixisteel; the First Fifty Years 1901 to 1951.** Charles F. Stone. 177 pages. 1951. Atlantic Steel Co., Atlanta, Ga.

History and growth of the Atlantic Steel Co. Includes a summary of the activities in which the company is now engaged.
(A2, D general, ST)

B

RAW MATERIALS AND ORE PREPARATION

118-B. World's Major Titanium Mine and Smelter Swing Into Full-Scale Production. Alvin W. Knoerr. *Engineering and Mining Journal,* v. 153. Mar. 1952, p. 72-79.

Surveys plant located at Sorel, Quebec. Flowsheet and description of the refining process used to produce a rich Ti slag and iron.
(B12, C21, Ti, Fe)

119-B. Wear Resistance; Steelworks Applications of Cast Basalt. *Iron & Steel,* v. 25, Mar. 1952, p. 84.

Properties of cast basalt and use for various refractory and abrasion resisting parts. (B19, T5)

120-B. New FluoSolids Experience. G. G. Copeland. *Mining Congress Journal,* v. 38, Mar. 1952, p. 42-44, 54.

Recent developments in the fluidized-bed process with special application to sulfide roasting for production of SO_2. (B15)

121-B. Ultra-Fine Grinding and Classification With Fluid Jet Pulverizers. M. F. Dufour and J. B. Chatelain. *Mining Engineering,* v. 4, Mar. 1952, p. 262-264.

Process for size reduction. Materials processed by this grinding method include nonmetallic and metallic minerals, ores, metals, and numerous other organic and inorganic products. (B13)

122-B. Contact Angles and Surface Coverage. W. Philippoff, S. R. B. Cooke, and Donald E. Cadwell. *Mining Engineering,* v. 4, Mar. 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 193, 1952, p. 283-386.

Investigation to determine quantitative relationships between the surface coverage of the mineral by the reagent, length of the hydrocarbon chain, and contact angle in flotation. (B14)

123-B. Concentration of Oxide Manganese Ores From Vicinity of Winkelman, Pinal County, Ariz. K. C. Dean, H. D. Snedden, and W. W. Agey. *U. S. Bureau of Mines,* Report of Investigations 4848, Feb. 1952, 21 pages.
(B14, Mn)

124-B. The Application of Ceramic Materials in Foundries and Steel Mills. (In French.) Marcel Guedras. *Métallurgie et la Construction mécanique,* v. 84, Feb. 1952, p. 87-88.

Various properties of a graphitized aluminum silicate called "Refractolithe", and its application in smelter liners and other uses. (B19)

125-B. Sampling of Lump-Form Solid Materials by a Random Method. (In French.) A. Palazzi. *Revue de Métallurgie,* v. 49, Jan. 1952, p. 22-34; disc., p. 34.

Sampling for chemical analyses and for other tests; calculation of the weight of the sample, reduction of the sample, determining the diameter of the pieces, accuracy of results, and sampling on an experimental basis. Charts, diagrams, and tables. (B11)

126-B. Acid Smelting of Manganese-Containing Iron Ores for the Production of Synthetic Manganese Ores and Their Smelting for Ferromanganese Production. (In German.) Paul Ischebeck and Jacob Willems. *Archiv für das Eisenhüttenwesen,* v. 23, Jan.-Feb. 1952, p. 1-14; disc., p. 14-15.

Reviews the literature on methods of stepwise oxidation and reduction for production of Mn-rich concentrates and of ferromanganese from iron ores. Laboratory tests prove the possibiilty of synthesizing low-phosphorus Mn slags by acid smelting of Mn-containing iron ores; and large-scale experiments prove the industrial feasibility of the process. Data are tabulated and graphed. 38 ref. (B15, D8, Fe-n, Mn)

127-B. Specific Electrical Conductivity of Slags Containing Ferrous Oxide. (In German.) Wilhelm Anton Fischer and Hans vom Ende. *Archiv für das Eisenhüttenwesen,* v. 22, Nov.-Dec. 1951, p. 417-423.

Investigations on slags of various compositions in the molten state. From the temperature dependence of specific conductivity, the activation energy of all but the semiconductive slags was calculated. Data are tabulated and charted. (B21, Fe)

128-B. Copper and Copper Alloys. 6. Concerning the Metallurgy of Copper. (Continued.) (In German.) W. G. R. DeJager. *Metalen,* v. 7, Feb. 15, 1952, p. 50-52.

The semifinished forms of Cu-ingots, anodes, bars, billets, cathodes, cakes, slabs, billets, etc. Amounts of permissible impurities in different types are tabulated. Production methods from ores. Includes flow diagram. (B general, C21, Cu)

129-B. The Earth's Known Uranium Ore Deposits. (In German.) E. Kohl. *Metall,* v. 6, Feb. 1952, p. 92-97.

Some tabulated data supplement discussion by countries and continents. (B10, U)

130-B. Mining and Smelting Industry of Finland. (In German.) Eero Mäkinen. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 4, Dec. 1951, p. 445-446.

Principal types of ore found in Finland and the companies mining and processing them. (B10, B general, C)

131-B. Air-Bubble and Flotation Processes. (In German.) Philipp Siedler. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 5, Feb. 1952, p. 49-54.

A review on the basis of the literature, particularly the role of the carrier gas, forces at the boundary surface, and the problem of adhesion of the mineral particle to the air bubble. Theories on the interpretation of these phenomena. 23 ref. (B14)

132-B. Problems in the Roasting of Magnetized Iron Ore in Rotating Kilns. (In German.) Walther Walbrecker. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 5, Feb. 1952, p. 54-61.

Practical suggestions, particularly concerning grain size, determination of optimum roasting temperature, and duration of roasting and cooling. Constructional changes practical for an increase of the output of smaller furnaces. Data are tabulated and charted. (B15, Fe)

133-B. Theory of Magnetic Separation of Weakly Magnetic Ores. (In Russian.) V. G. Derkach. *Izvestiia Akademii Nauk SSSR,* Section of Technical Sciences. June 1951, p. 852-862.

An investigation was made by an analysis of the magnetic and mechanical forces acting on the pieces of ore. Includes both theoretical curves for magnetic ores in general and for Mn and Fe ores. (B14, Mn, Fe)

134-B. Change of Electrical Resistance of Magnetite During Magnetization. (In Russian.) M. A. Grabovskii. *Izvestiia Akademii Nauk SSSR,* Geophysical Series, July-Aug., 1951, p. 61-70.

Results of investigation are considered from the standpoint of the theory of ferromagnetism. Data are charted. 22 ref. (B15, B16, Fe)

135-B. Protective Action of Ammonium Salts During Flotation of Pyrites, Arsenopyrites and Certain Other Sulfide Minerals in Calcareous Media. (In Russian.) I. N. Plaksin and G. A. Miasnikova. *Izvestiia Akademii Nauk SSSR,* Section of Technical Sciences, July 1951, p. 1046-1064.

Studies were made on action of lime and NH_4Cl during flotation of above minerals. The specific action on each of the minerals was determined. Data are tabulated and charted. 21 ref. (B14)

136-B. Treatment of Manganese Slimes and Ores With Sulphur Dioxide Gas. (In Russian.) V. M. Kakabadze. *Zhurnal Prikladnoi Khimii,* v. 24, July 1951, p. 682-689.

The conversion of $MnCO_3$ ores to $MnSO_3$ by SO_2 gas followed by oxidation to $MnSO_4$ was investigated. Combinations of this treatment with roasting and H_2SO_4 treatment. Data are tabulated and charted. (B14, B15, Mn)

137-B. The Adsorption of Sodium Cetyl Sulphate on Cassiterite. G. R. Edwards and W. E. Ewers. *Australian Journal of Scientific Research,* ser. A, v. 4, Dec. 1951, p. 627-643.

Adsorption on pure synthetic cassiterite was measured under various conditions of concentrataion and pH, and the results related to flotation. Only a small proportion of the surface need be covered with collector ions to make flotation possible. A mechanism for adsorption of cetyl sulfate ions is proposed, in which these ions exchange with hydroxyl ions on the hydrated surface. Samples of natural cassiterite differed from one another and from the synthetic mineral, in their ability to be floated under certain conditions. This is attributed to the effect of metallic impurities. 20 ref. (B14, Sn)

138-B. New Methods in the Statistical Evaluation of Mine Sampling Data. Herbert S. Sichel. *Bulletin of the Institution of Mining and Metallurgy,* Mar. 1952; *Transactions,* v. 61, pt. 6, 1951-52, p. 261-288.

A new procedure, based on Fisher's theory of maximum likelihood, is suggested as a replacement of the conventional arithmetic mean. Both the *t* estimator and the arithmetic mean are unbiased estimates of the true unknown average grade. The *t* estimator has the advantage of having a reliability higher than the arithmetic mean; being less sensitive to occasional high assays; and lying nearer to the true mean grade in the majority of cases. Tables facilitating computation of *t* are given in the Appendix. 15 ref. (B11)

139-B. Hydrogen Tube Reduces Oxides. *Chemical Engineering,* v. 59, Mar. 1952, p. 252.

Recent pilot-plant work shows that metallic oxides can be reduced continuously with hydrogen in a simple furnace. Close temperature control is vital. Work was done on iron oxides, but application to other metals is believed feasible. (B15, Fe)

140-B. A New Solvent Extraction Method for the Separation of Niobium and Tantalum. G. W. Leddicotte and F. L. Moore. *Journal of the American Chemical Society,* v. 74, Mar. 20, 1952, p. 1618.

A preliminary report, including tables. (B14, Cb, Ta)

141-B. Electric Furnace Ferro-Alloys and Calcium Carbide. Joseph H. Brennan. *Journal of the Electrochemical Society,* v. 99, Mar. 1952, p. 61C-63C.

A review of production. (B22, Fe-n)

142-B. The Mineral Resources of Jordan. A. M. Quennell. *Mining Journal,* v. 238, Mar. 14, 1952, p. 266-267. (Based on paper in *Colonial Geological Surveys,* v. 2, No. 2.)

Resources of metallic and nonmetallic minerals, and bituminous limestone. (B10)

143-B. How To Produce More Tungsten. Blair Burwell. *Mining World,* v. 14, Apr. 1, 1952, p. 33-37, 88.

Metallurgical results and operating costs of Salt Lake City chemical tungsten refinery. Integration of tungsten milling and chemical refining plants should create a market for low-grade material and assure production from many new mines. (B13, B14, W)

144-B. Plans for Steel Mill in Peru; Project Extending Industrialization in Latin America to Go Ahead. *Times Review of Industry,* new ser., v. 6, Mar. 1952, p. 85.

Plans for development of the Marcona iron ore deposits near Lima. (B10, A4, ST)

145-B. Process for Recovering Gold and Silver From Activated Carbon by Leaching and Electrolysis. J. B. Zadra, A. L. Engel, and H. J. Heinen. *U. S. Bureau of Mines* Report of Investigations 4843, Feb. 1952, 32 pages.

Modified process for removal or desorption of both Au and Ag from loaded carbon. This process permits use of activated carbon for extracting both metals from Au ores carrying enough Ag to have economical interest, or in which Ag is the predominant value. Hot caustic cyanide solution at atmospheric pressure is used for extraction of both Au and Ag from activated carbon by simultaneous leaching and electrolysis. (B14, Au, Ag)

146-B. Benefication of Oxide Manganese Ores From Arapahoe, Douglas, Saguache, Custer, Chaffee, and Park Counties, Colo. R. R. Wells, K. C. Vincent, and T. F. Mitchell. *U. S. Bureau of Mines,* Report of Investigations 4845, Feb. 1952, 16 pages. (B14, Mn)

147-B. Manganese Concentrates From Open-Hearth Slags by Lime-Clinkering (Sylvester) Process. John A. Ruppert. *U. S. Bureau of Mines,* Report of Investigations 4847, Feb. 1952, 26 pages.

It has been proposed that addition of enough limestone to an open-hearth slag to give a $CaO{\cdot}3P_2O_5/SiO_2$ ratio of approximately two, followed by firing in an oxidizing atmosphere under proper conditions of time and temperature, will result in a clinker having a magnetic phase containing a preponderance of Mn, Fe, Al, and Mg as oxides and a nonmagnetic

phase consisting for the most part of a phosphorus-containing dicalcium silicate. It has been postulated further that the metal oxide phase can be recovered by fine grinding and magnetic separation. These broad principles have been substantiated by numerous clinkering operations made in various types of kilns. Diagrams and charts. (B21, D2, Mn)

148-B. Concentration of Oxide Manganese Ores From San Bernardino County, Calif. W. W. Agey, S. J. Hussey, and W. J. Long. *U. S. Bureau of Mines*, Report of Investigations 4846, Feb. 1952, 14 pages.

Test work included heavy-media separation, tabling of sized fractions, manganese flotation and flotation of table slimes; jigging; magnetic concentration; etc. (B14, Mn)

149-B. Magnetic Separation. R. H. Stearns. "Encyclopedia of Chemical Technology. Vol. 8" (Interscience Encyclopedia, New York), 1952, p. 624-638.

Equipment and procedures. Applicability of the process to various ores and other materials. (B14)

150-B. The Presence of Uranium in North African Phosphates. (In French.) Antoine A. Guntz. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 234, Feb. 18, 1952, p. 868-870.

Composition of specimens taken from different parts of North African phosphate beds which indicate the presence of uranium. (B10, U)

151-B. Discovery of Uranium in the Phosphate Deposits of Morocco. (In French.) André Lenoble, Henri Salvan, and Valéry Ziegler. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 234, Feb. 25, 1952, p. 976-977.

A series of measurements of the density of β and γ radiations in the phosphate deposits of Morocco was made. (B10, U)

152-B. Caribbean Bauxite. (In French.) G. A. Baudart. *Revue de l'Aluminium*, v. 29, Jan. 1952, p. 1-3.

Known since 1869, and rediscovered in 1942, Jamaican bauxite bodies are moving into the picture as the main source of supply for the North American aluminum producers. Three companies, one Canadian and two American, are setting up mining and ore treatment plants. The geographical position of the island, compared with that of the Guianas, will lead to a more than 50% cut on the present sea journey of the ore to the American plants on the Gulf. (B10, Al)

153-B. Theory of Crushing of Rocks (Minerals). II. Separation of Particles Into Two Fractions and Calculation of the Average Composition of These Fractions. (In Russian.) B. M. Zviagin, R. B. Rozenbaum, O. M. Todes, and A. Z. Iurovskii. *Izvestiia Akademii Nauk SSSR*, Section of Technical Sciences, Aug. 1951, p. 1218-1229.

Method for determination of the relative number of floated and settled particles during their separation into two fractions. Data are tabulated and charted. (B14)

154-B. The Alchemy of Arvida. Wm. G. Dulmage. *Canadian Chemical Processing*, v. 36, Mar. 1952, p. 70-71, 74.

Role of chemistry at Alcan (Canada) by following through the various steps in Al production in normal sequence, particularly concerning alumina. Production of HF, AlF_3, synthetic cryolite, NaOH, carbon lining and electrodes, and alum. Flow sheet. (B14, Al)

155-B. The Utilization of Low-Grade Domestic Chromite. K. W. Downes and D. W. Morgan. *Canadian Mining and Metallurgical Bulletin*, v. 45, Mar. 1952, p. 167. (A condensation.)

Seven pertinent chemical processes which have been developed for beneficiation of chromite ores. (B14, Cr)

156-B. Chemicals From Pyrites. *Journal of Southern Research*, v. 4, Mar.-Apr. 1952, p. 11-13.

Ore refining and research at Tennessee Corp., where a variety of products are developed based on Cu resources. They have taken over a 100-yr.-old Cu mining activity and established a modern chemical processing enterprise that is producing an ever-growing list of valuable products. (B general, Cu)

157-B. Factors Affecting Flotation. Part I. H. J. Gisler. *Pit and Quarry*, v. 44, Mar. 1952, p. 121-125, 131.

Reprinted with changes from a Denver Equipment Co. bulletin. Methods of controlling grade of ore, tonnage, grind, dilution, time, temperature, and reagents. (To be continued.) (B14)

158-B. Joint Action of Certain Reagent-Collectors During Flotation Concentration. (In Russian.) I. N. Plaksin and V. A. Glembotskii. *Doklady Akademii Nauk SSSR*, new ser., v. 82, Jan. 1, 1952, p. 139-141.

Mixtures of ethyl and isoamyl xanthates were used in flotation experiments with various sized particles of galena. Results are tabulated. (B14, Pb)

159-B. (Book) **Mineral Forecast 2000 A. D.** Edward Steidle. 152 pages. 1952. School of Mineral Industries, Pennsylvania State College, State College, Pa. (Circular 39.)

Reviews our dependence on outside sources for various strategic and critical mineral supplies, together with the necessity for down-to-earth mineral policies. How education and research can constantly point out new directions of effort and prove that what we lack in quality resources can be offset by better brains and skills. Establishes a long-range goal toward which the activities of Pennsylvania's School of Mineral Industries can be directed. (B10, A3)

C

NONFERROUS EXTRACTION AND REFINING

46-C. High-Purity Metals at Last. *Business Week*, Mar. 22, 1952, p. 133-134, 136.

A purifying technique by National Research Corp., Cambridge, Mass. A metal is melted in a high vacuum; this takes out the trapped gases and prevents the formation of oxides. At present, the process is important to the production of Ti and Zr. Later, it is believed that it will probbly play a big part in the production of magnetrons. (C25, Ti, Zr)

47-C. Production of Pure Rare Earth Metals. Frank H. Spedding, Harley A. Wilhelm, Wayne H. Keller, Donald H. Ahmann, Adrian H. Daane, Clifford C. Hach, and Robert P. Ericson. *Industrial and Engineering Chemistry*, v. 44, Mar. 1952, p. 553-556.

A method was devised in which anhydrous rare-earth chlorides are reduced by Ca in refractory oxide-lined containers. Vacuum remelting removes all but trace amounts of Ca. La, Ce, Pr, Cb have been produced purer than 99.7%. 25 ref. (C25, EG-d, La, Ce, Pr, Cb)

48-C. The Separation of Titanium, Zirconium and Thorium by Ion Exchange. William E. Brown and William Rieman, III. *Journal of the American Chemical Society*, v. 74, Mar. 5, 1952, p. 1278-1282.

Method developed. Radiochemical work with Ti^{51} showed that the radioactive isotope was, to a certain extent, separated from the normal isotopes. (C28, P13, Ti, Zr, Th)

49-C. Treasure From the Slag Pile. A. W. Martinez. *Steelways*, v. 8, Mar. 1952, p. 1-3.

New method of recovering Mn from hitherto worthless slag, devised by the steel industry in cooperation with the U. S. Bureau of Mines. The new process results in synthetic Mn ore containing 55-63% Mn. (C21, A8, Mn)

50-C. Cryoscopy at High Temperature. (In French.) Georges Petit. *Revue Générale des Sciences pures et appliquées*, v. 58, Nos. 11-12, 1951, p. 324-340.

High-temperature cryscopy applies classical techniques and theories to the problems of molten-salt solutions. Relationship to aqueous salt solutions, and application to electrochemistry and electrometallurgy. (To be continued.) (C23)

51-C. Autogenous Smelting of Sulfidic Copper Ores; Production of Iron From Iron Silicate Slags of Copper Smelting Furnaces. (In German.) Petri Bryk. *Zeitschrift für Erzbergbau und Metallhüttenwesen*, v. 4, Dec. 1951, p. 447-450.

Special type of copper smelting, developed because Finland has no cheap electric power at its disposal since the second World War, and no domestic fuel either. Details of process; also a new closely related process for the production of iron and steel. (C21, D general, Cu, Fe, ST)

52-C. Behavior of the Nobler Metals During Refining of Aluminum According to the Triple-Layer Process. (In German.) G. Grube and P. Hantelmann. *Zeitschrift für Elektrochemie Bericht der Bunsengesellschaft für Physikalische Chemie*, v. 56, Jan. 1952, p. 1-8.

Experiments on measuring the potentials of anodic solution of Mn, Si, Zn, Fe, Cu, and Ag in the electrolyte used for refining of Al, as a means of developing a method for refining Al scrap and Al-rich alloys. The high vapor pressure of Zn at the test temperature (850° C.) is shown to be the reason why small concentrations of Zn pass into the cathode aluminum. Tables and graphs. (C23, Al)

53-C. Electrolysis of Molten Cuprous Chloride. (In German.) Paul Drossbach. *Zeitschrift für Elektrochemie Berichte der Bunsengesellschaft für Physikalische Chemie*, v. 56, Jan. 1952, p. 23-31.

Theoretical studies and experiments on current yields and polarization potentials under different conditions. Diagrams, graphs, tables, and photographs. (C23, Cu)

54-C. Electrolysis of Nickel Chloride. (In German.) Paul Drossbach. *Zeitschrift für Elektrochemie Berichte der Bunsengesellschaft für Physikalische Chemie*, v. 56, Jan. 1952, p. 31-35.

Method of determining current yields and polarization potentials in electrolysis of $NiCl_2$ mixed with molten NaCl + KCl. Concentration polarization resulting from diffusion is theoretically analyzed. (C23, Ni)

55-C. Influence of Tribenzylamine on the Process of Electrocrystallization of Tin. (In Russian.) A. A. Kriukova and M. A. Loshkarev. *Doklady Akademii Nauk SSSR*, new ser., v. 81, Dec. 21, 1951, p. 1097-1100.

Results of experimental investigation are charted and tabulated. Effects of different additives to the deposition solutions were determined. (C23, Sn)

56-C. The Production of Pure Cerium Metal by Electrolytic and Thermal Reduction Processes. *Bulletin of the Institution of Mining and Metallurgy,* Mar. 1952; *Transactions,* v. 61, pt. 6, 1951-52, p. 289-298.

Discussion of above paper by P. M. J. Gray (Jan. 1952 issue; item 25-C.) (C23, C21, Ce)

57-C. Production of Titanium Ingots by Melting Sponge Metal in Small Inert-Atmosphere Arc Furnaces. W. E. Kuhn. *Journal of the Electrochemical Society,* v. 99, Mar. 1952, p. 89-96.

Two laboratory arc furnaces are described. Satisfactory melting of Ti sponge in the inert-atmosphere arc furnace using nonconsumable electrodes is limited to sponge low in $MgCl_2$, because the presence of entrained chloride causes spattering of the molten Ti onto the electrode tip, and contamination of the melt by the electrode material. 16 ref. (C21, Ti)

58-C. Development of Graphite Electrodes and Study of Heat Losses With Different Electrodes in the Single Electrode Inert-Atmosphere Arc Furnace. W. E. Kuhn. *Journal of the Electrochemical Society,* v. 99, Mar. 1952, p. 97-108.

A Ti-TiC coated graphite-tipped electrode was developed for melting Ti without excessive C pickup. The principles evolved from the melting of Ti and Zr may be extended to the development of graphite tips coated with other carbide-forming elements. The effect of varying arc length, arc current, and arc voltage on the steady-state heat losses in the cooling water supplied to the electrode, crucible walls, and crucible bottom was studied. Tungsten-tipped electrodes exhibited more efficient arc melting characteristics than graphite tips. Tabular and graphical data. (C21, T5, Ti)

59-C. Removal of Magnesium and Magnesium Chloride From Titanium by Vacuum Distillation. M. A. Cook and F. S. Wartman. *U. S. Bureau of Mines,* Report of Investigations 4837, Feb. 1952, 17 pages.

A method of vacuum purification in which the crude mixture is heated in a vacuum at about 1700° F. and the Mg metal and chloride volatilized away from the Ti, leaving it practically Mg-free in a sponge-metal form. The pilot-plant equipment, together with the technique of operation and methods of sponge recovery. Operating data; and power and labor requirements. (C25, Mg, Ti)

60-C. Vacuum Metallurgy; Its Characteristics and Its Scope. W. J. Kroll. *Vacuum,* v. 1, July 1951, p. 163-184.

The actual and potential uses of vacuum methods in metallurgy. Existing furnace designs, their performance, and limitations. A large variety of metallurgical procedures, where the application of vacuum would appear to offer advantages. Melting and separation of metals are emphasized; however, considerable attention to vacuum processing of inorganic compounds is also given. 88 ref. (C25, D8)

61-C. Refining of Aluminum-Silicon Alloys. (In French.) Louis Grand. *Revue de l'Aluminium,* v. 29, Jan. 1952, p. 5-15.

Modification of the texture of Al-Si alloys caused by alkali metals or their fluorides leads to an important improvement of the mechanical characteristics of these alloys. Grain refining which occurs during a limited period of time can be obtained at any temperature ranging from about 720 to 820° C. In the particular case of high-Si alloys, phosphorus causes a lasting structural modification and the metal is more easily machined than if it had been refined with alkali metals. (C26, Al)

62-C. Reactions in the Muffle of a Zinc Furnace. (In Polish.) A. Krupkowski and J. Sosin. *Prace Glownego Instytutu Metalurgii,* v. 3, No. 6, 1951, p. 437-461.

During the reduction of Zn, a number of chemical reactions take place in the muffle of a furnace between carbon and the compounds of Zn, Pb, Fe, Cu, Cd, Sn, etc. The composition of gas evolved from the Zn dust is used as basis for calculation of direction and intensity of above reactions at 1200° K. Conclusions are summarized in English. Data are tabulated and charted. (C21, Zn)

63-C. Investigations of the Solidification of Duralumin in a Water-Cooled Sheet-Iron Ingot Mold. (In Polish.) M. Schneider and E. Zalesinski. *Prace Glownego Instytutu Metalurgii,* v. 3, No. 6, 1951, p. 491-500.

The process takes place in two stages, loss of heat by radiation and the solidification process in the interior of the ingot. Diagram for the process and recommendations for rate of cooling. (C5, N12, Al)

64-C. The Reduction of Copper Oxide by Hydrogen. (In Russian.) M. M. Pavlinchenko and Ia. S. Rubinchik. *Zhurnal Prikladnoi Khimii,* v. 24, June 1951, p. 666-670.

Experiments were made to study the dependence of the rate of reduction of copper oxide on temperature and the presence of other materials. Results are charted. 11 ref. (C2, Cu)

65-C. The Influence of Roasting Temperature Upon Gold Extraction by Cyanidation From Refractory Gold Ores. R. Carter and C. S. Samis. *Canadian Mining and Metallurgical Bulletin,* v. 45, Mar. 1952, p. 160-166; *Transactions of the Canadian Institute of Mining and Metallurgy,* v. 55, 1952, p. 130-136.

A laboratory method, using aqueous oxidation under high oxygen pressures, in which gold recovery from the calcines was over 98%. Photomicrographs, diagrams, and tables. (C24, Au)

D

FERROUS REDUCTION AND REFINING

172-D. Heat Flow Problems; Outline of the Relaxation Method of Calculation. L. F. Daws. *Iron & Steel,* v. 25, Feb. 1952, p. 65-68; Mar. 1952, p. 102-105.

Develops a particular example of a steady-state heat-flow problem in which temperature distribution in a cylindrical ingot heated to constant temperature over its curved surface at one end while cooling to ambient temperature at the other is worked out. Technique for the solution of the unsteady state heat-flow problem. 27 ref. (D9, C5, U1)

173-D. Steel in South Africa. *Iron & Steel,* v. 25, Mar. 1952, p. 93-94.

Details of projected Krupp-Renn plant, bessemer plant, and steel mills. Expected output is 70,000 short tons of pig iron and 48,000 tons of rolled steel per year. Flow diagrams. (D8, D3, F23, CI, CN)

174-D. Pipes in Cast Steel Ingots and Pieces. (In French.) Lazare Quincy. *Métallurgie et la Construction mecaniques,* v. 83, Dec. 1951, p. 971, 973, 975, 977; v. 84, Jan. 1952, p. 13, 15-17, 19.

Pipe in killed and rimmed steels and the use of hot tops as a remedy. Prevention by electrical heating of the feedheads. Photographs, micrographs, and macrographs. (D9, ST)

175-D. Why Should an Openhearth Furnace be Blown? (Concluded.) J. E. Lafon. *Métallurgie et la Construction mécanique,* v. 83, Jan. 1952, p. 47, 49-51.

Burner research, effects of symmetry of the air and gas ports, valves and regulators, and pros and cons of use of blowers. (D2, ST)

176-D. Role of Hydrogen in Blast Furnaces and Its Effects. (In French.) J. G. Platon. *Revue de Métallurgie,* v. 49, Feb. 1952, p. 125-128.

Thermodynamic equilibria in the blast furnace; oxidation in the blast tuyeres; direct reduction in the crucible; necessity for combustion of hydrocarbons in the blast; injection of fuel; the general problem of fuel requirements; and role of O_2 and H_2 in the blast furnace. (D1, Fe)

177-D. Study of Oxygen Injection in an Openhearth Furnace Using Coke Oven Gas as Fuel. G. Husson and J. Donney. (In French.) *Revue de Métallurgie,* v. 49, Feb. 1952, p. 145-163.

The furnace and equipment provided for oxygen injection. Extensive operating data are tabulated and discussed. (D2, ST)

178-D. Radiochemical Investigation Methods for Metallurgical Processes. (In German.) Walter Koch and Kurt Fink. *Archiv für das Eisenhüttenwesen,* v. 22, Nov.-Dec. 1951, p. 371-375.

By adding radioactive sulfur, S^{35}, to the fuel gas for an openhearth furnace, the ratio of S passing into the steel from the heating gas was determined. Results are charted. Schematic diagrams illustrate the equipment used. (D2, S19, ST)

179-D. Melting Crucible of Calcium Phosphate; Metallurgy of the Basic Bessemer Process. (In German.) Gerhard Trömel and Willy Oelsen. *Archiv für das Eisenhüttenwesen,* v. 23, Jan.-Feb. 1952, p. 17-20.

The $FeO\text{-}3CaO\text{-}P_2O_5$ constitution diagram indicates that calcium orthophosphate is a suitable crucible material for studying the equilibrium between molten Fe and P-rich slags. Production of this type of crucible. Iron melted in it contains only 0.025% P. Data are charted. (D3, ST)

180-D. Electric Furnace: New Customer for Coal Industry. *Business Week,* No. 1178, Mar. 29, 1952, p. 50-52, 54, 59.

Technical and economic factors of the electric-furnace method of making steel, as opposed to the openhearth method. The electric furnace can reduce beneficiated low-grade ores to steel in a single operation. It completely bypasses the coke oven and blast furnace, two basic and time-consuming steps in the openhearth method. Large amounts of coal will be utilized to generate electric power for the furnaces, or in the preparation of sinter from coke and ore. (D5, ST)

181-D. Production of Steel by the Oxygen-Impingement Process. Th. E. Suess. *Iron and Steel Engineer,* v. 29, Mar. 1952, p. 91-93. (Translated from Yearbook of the United Austrian Iron and Steel Works (Voest), Linz, Austria.)

Process in which pure oxygen is blown down onto the bath in a converterlike vessel. Operative experiences obtained. Claims that the process refines pig iron so that blown steel needs no deoxidizing additions and that it is cheaper than the usual openhearth process. (D2, ST)

182-D. Electric Furnaces in the Iron and Steel Industry. H. S. Newhall. *Journal of the Electrochemical Society*, v. 99, Mar. 1952, p. 63C-64C.

Emphasis on steelmaking furnaces. (D general, Fe, ST)

183-D. Direct Reduction of Iron Ore. *Metal Progress*, v. 61, Mar. 1952, p. 147-148, 150.

See abstract of "Direct Reduction of Iron Ore Using the Fluidized Solids Technique," M. Tenenbaum and C. M. Squarcy, *American Iron and Steel Institute*, Preprint, 1951; item 174-D, 1951. (D8, Fe)

184-D. Factors Affecting Open-Hearth Productivity. W. G. Cameron and A. I. Aitken. *West of Scotland Iron and Steel Institute Journal*, v. 58, 1950-51, p. 65-145; disc., p. 145-171.

Firing with rich and lean fuels, the various types of refractory and their characteristics, and the fundamentals of openhearth furnace design. Aspects of checkerwork and methods of calculation. Reversing valves and flues. The all-basic furnace and some notes on waste heat recovery. 21 ref. (D2, ST)

185-D. Blast Furnace Operation at High Top Pressure. R. P. Towndrow. *West of Scotland Iron and Steel Institute Journal*, v. 58, 1950-51, p. 172-214; disc., p. 214-220.

See abstract from *Engineering;* item 207-D, 1951. (D1, Fe)

186-D. Experiments on Production of Basic Bessemer Steels Having Low Nitrogen and Phosphorus Contents. (In German.) Karl Mayer, Helmut Knüpple, and Heinz Pottgiess. *Stahl und Eisen*, v. 72, Feb. 28, 1952, p. 225-232.

Describes, diagrams, and illustrates a German plant. Method of blowing with O_2-enriched air and with O_2-CO_2 mixtures; application of elevated pressures. Effect of N_2, P, and O_2 on embrittlement susceptibility of low N and P steels. Data are charted and tabulated. 12 ref. (D3, ST)

187-D. Possibilities for Improvement of Basic Bessemer Steel by Adding Oxygen to the Blast. (In German.) Walther Dick. *Stahl und Eisen*, v. 72, Feb. 28, 1952, p. 233-242.

Results for a large number of basic bessemer heats blown with O_2-enriched air. Composition data; correlations between N_2 and P content and between P and O_2 content; segregation and nonmetallic inclusions; cropping and surface finishing of ingots; drawability and workability of wire made from aged bessemer steel; results of notched-bar impact tests and bending tests; weld-deposition tests; and remagnetization losses for transformer sheets made from this steel. (D3, ST)

188-D. Manufacture of Basic Bessemer Steel by Addition of Limestone Splinters and Oxygen. (In German.) Walter Bertram. *Stahl und Eisen*, v. 72, Feb. 28, 1952, p. 243-245.

Manufacture of air-refined steel from basic bessemer pig, without preliminary ladle refining, as a substitute for openhearth steel. Limestone is added after combustion of Si. Two minutes later, fluorspar-free ore is added in lumps. From the 6th to the 12th min., O_2 is added up to a maximum of 35%. Application for deep drawing sheet and strip. (D3, ST)

189-D. Melting Stainless Steel in the Electric-Arc Furnace and Its Refining With Oxygen. (In German.) Karl Bungardt, Edmund Pakulla, and Kurt Tesche. *Stahl und Eisen*, v. 72, Feb. 28, 1952, p. 245-255.

Experimental heats in a 300-Kg. furnace; also results of production heats in 10, 20, and 30-ton furnaces. Efficiency and working pressure of O_2; stability of metallic oxides; temperature dependence of the Cr-C equilibrium; decarburization rate; oxygen consumption; carbon content before refining; life of oxygen-inlet tubes and of refractory linings; power savings; and workability of the steel produced. Tables and graphs. 27 ref. (D5, SS)

190-D. Recent Developments in Blast Furnace Practice. J. K. Brandwood. *Australasian Institute of Mining and Metallurgy, Proceedings*, new ser., Mar. 31-June 30, 1947, p. 151-172.

Historical data concerning development of the furnace itself from early days. Modern ideas on raw materials and their beneficiation. Recent furnace design and modern auxiliaries. Some developments in practical operation. (D1, Fe)

191-D. Coal Utilization in Modern Steelworks Practice. J. D. Norgard and W. H. Brook. *Australasian Institute of Mining and Metallurgy, Proceedings*, new ser., Mar. 31-June 30, 1947, p. 255-278.

What happens to the coal consumed annually by a modern steel plant. Compares the 3 tons of coal per ton of finished product of 35 years ago and the present consumption of 1½ tons of coal per ton of finished product. (D general, B18, ST)

192-D. Review of High Top Pressure Operation. John R. Barnes. *Blast Furnace & Steel Plant*, v. 40, Apr. 1952, p. 407-409, 415.

See abstract from *Steel*, item 152-D, 1952. (D1, ST)

193-D. Solidification and Segregation in Killed Steel Ingots. Edward A. Loria. *Blast Furnace & Steel Plant*, v. 40, Apr. 1952, p. 410-415.

Mode and type of solidification and relation to segregation. 12 ref. (D9, M27, ST)

194-D. Abrasion-Resistant Refractory Materials as Applied to Blast Furnace Operations. Frank C. Roe and Herbert S. Schroeder. *Blast Furnace & Steel Plant*, v. 40, Apr. 1952, p. 429-435, 442, 458, 460.

Applications, abrasive action, test equipment and procedure. Diagrams and illustrations. (D1)

195-D. Projecting and Depressed Crazing of Ingot Moulds; A Microscopical Examination at the Inner Surfaces of 10-Ton Moulds. R. E. Lismer, and F. B. Pickering. *Journal of the Iron and Steel Institute*, v. 170, Mar. 1952, p. 263-267.

Two 10-ton ingot molds, representative of the projecting and depressed types of crazing on the inner surfaces, which were associated with short and long tap-to-strip times respectively, were examined. Concludes that projecting crazing results from growth at the inner surface and from the development surface, growth being of subsidiary importance. Photomicrographs. (D9, M27, T5, CN)

196-D. Ensley's High Pressure Turbo-Blowers Increase Production, Decrease Coke Rates. J. J. Shannon. *Journal of Metals*, v. 4, Apr. 1952, p. 369-376.

Improvement in efficiency of blast-furnace operation through installation of Ensley high-pressure, 5-stage turbo-blowers. Graphs and tables. (D1. Fe)

197-D. European Experiments on Vacuum-Melted Pure Iron. Tom Bishop. *Metal Progress*, v. 61, Apr. 1952, p. 75-81.

The melting process and the effect of alloying elements on mechanical properties of iron. (D8, Q23, Fe)

198-D. Refining Steel With Oxygen. Franz Rapatz. *Metal Progress*, v. 61, Apr. 1952, p. 94.

Process by which molten iron is blown with oxygen to make steel without any external source of heat. Advantages of the system. (D3, ST)

199-D. Blast Furnace Practice. VI(d). Generation, Recovery and Use of Heat. VII. Comparative Values of Fluxing Stones. VIII. Slag Composition Research. IX(a). The Raw Materials Problem. Charles E. Agnew. *Steel*, v. 130, Mar. 17, 1952, p. 98, 100, 103, 106, 109-110; Mar. 24, 1952, p. 90, 93-94; Mar. 31, 1952, p. 86, 88, 90, 92, 95; Apr. 7, 1952, p. 121-122, 124, 126, 129, 132, 134, 137, 138.

Shows how the existence of a high-temperature zone in every blast-furnace operation causes a carbon-solution loss reaction. Carbon in the form of CO can be returned to the furnace as blast heat. Part VII: A comparison of operating conditions in Southern and Eastern areas of the U. S. indicates that economy of calcite and dolomite fluxes is determined by the need for their chemical constituents, and not alone by SiO_2-CaO ratio. Part VIII: A combination of furnace reactions and disclosures on slag-mineral compositions is of greater value than any other for visualizing thermal conditions within the furnace. Part IX (a): Development in the art of producing Fe in a blast furnace has advanced with better understanding of raw-material properties and their effects on operating economy. (To be continued.) (D1, ST)

200-D. Joint Discussion on the Papers—Symposium on Stresses in Moulds. Ingot Heat Conservation; Ingot Mould Temperature Measurements, by R. T. Fowler and J. Stringer; **Ten-Ton Ingot Moulds: Comparison of Design and Conditions of Use,** by A. Jackson. *Journal of the Iron and Steel Institute*, v. 170, Mar. 1952, p. 226-231.

Papers published in Mar. 1951 issue; item 151-D, 1951. (D9, S16, ST)

201-D. Joint Discussion on the Papers—The Production of High-Purity Iron Alloys on a 25-lb Scale, by B. E. Hopkins, G. C. H. Jenkins, and H. E. N. Stone; **Tensile and Impact Properties of Iron and Some Iron Alloys of High Purity,** by W. P. Rees, B. E. Hopkins, and H. R. Tipler. *Journal of the Iron and Steel Institute*, v. 170, Mar. 1952, p. 243-248.

Papers published respectively in Aug. and Oct. 1951 issues; items 286-D, 1951, and 53-D, 1952. (D8, Fe)

202-D. Joint Discussion on the Papers—Full-Scale Blast-Furnace Trials, by J. A. Bond and T. Sanderson; **Distribution of Materials in the Blast-Furnace. Part III. Further Factors Influencing the Distribution of Solids in the Blast-Furnace,** by R. Wild. *Journal of the Iron and Steel Institute*, v. 170, Mar. 1952, p. 256-260.

Papers published respectively in May and Dec. 1951 issues; items 194-D and 231-D, 1951. (D1, Fe)

203-D. Discussion on the Paper—The Present Position of the Converter Process: Economic Comparison With Other Steelmaking Processes, by B. Matuschka. *Journal of the Iron and Steel Institute*, v. 170, Mar. 1952, p. 260-261.

Paper published in May 1951 issue; item 195-D, 1951. (D3, D2, ST)

E

FOUNDRY

215-E. Cross-Section of a Non-Ferrous Jobbing Foundry. J. Gorman. *Foundry Trade Journal*, v. 92, Feb. 21, 1952, p. 189-199; Feb. 28, 1952, p. 229-231.

Foundry practice in author's shop in Scotland. (E general, A5, EG-a)

216-E. Design of Iron Castings. K. H. Collinson. *Foundry Trade Journal,* v. 92, Feb. 28, 1952, p. 217-219; disc., p. 219-221.

Development of new conceptions in industrial design. Foundry methods for woodworking tools. Casting quality and finish and relation to cost. (E general, CI)

217-E. History of Aluminium-Alloy Casting. A. P. Fenn. *Foundry Trade Journal,* v. 92, Feb. 28, 1952, p. 223-228.

Various aspects of the developments that have taken place in the Al foundry during the past 40 years. (E general, Al)

218-E. Pressure Die Casting. *Metal Industry,* v. 80, Feb. 29, 1952, p. 169-170.

The plant layout of the High Duty Alloy Ltd., Slough, Bucks. (E13)

219-E. Plaster Mold Castings Are Tougher and Smoother Than Sand Castings of the Same Alloy. T. H. Kummer. *Precision Metal Molding,* v. 10, Mar. 1952, p. 27-30.

Savings and improvements attained by Cherry-Burrell Corp. in converting from 22% Ni-bearing Cu-alloy sand casting to 15% Ni-brass plaster-mold castings to produce sanitary filling and capping machinery. Includes barrel-polishing techniques. (E16, L10, Ni, Cu)

220-E. A Review of Factors Influencing the Use of Permanent Mold Castings. *Precision Metal Molding,* v. 10, Mar. 1952, p. 31, 66-68.

Includes a comparison with sand and die castings. (E12)

221-E. High-Speed, High-Strength Part Is Produced by Investment Casting. Louis C. Blesch. *Precision Metal Molding,* v. 10, Mar. 1952, p. 42-43.

Comparison with sand-cast and forged parts. Part is made from an alloy steel MC-6 of Michigan Steel Casting Co.; its housing from Al. (E15, AY, Al)

222-E. The Sand-Block Casting Process. (Flaskless Casting Process.) (In German.) R. Weidner. *Giesserei,* v. 39, Jan. 24, 1952, p. 25-29.

Production of metal patterns. Advantages of methods and production figures tabulated. Possibilities of application are shown by examples taken from foundry practice. (E11, E17)

223-E. Grain Formation in Steel Produced in Small Converters and Its Annealing. (In German.) F. Roll. *Giesserei,* v. 39, Jan. 24, 1952, p. 30-31.

Effects of various factors, especially composition and annealing temperatures. (E25, J23, CI)

224-E. Preliminary Work on the Commercial Production of Cast Iron With Nodular Graphite in Poland. (In German.) *Giesserei,* v. 39, Jan. 24, 1952, p. 31-32. (From *Przeglad Odlewnictwa,* v. 1, No. 1, 1951, p. 3-4.)

Includes photomicrographs. (E25, CI)

225-E. Working With Synthetic Molding Sand. (In German.) H. Herschenz. *Giesserei,* v. 39, Feb. 7, 1952, p. 54-56.

Synthetic molding sand mixed with 0.75-1.5% bentonite and 6-7% water yields fully satisfactory castings. Data are graphed and tabulated. (E18)

226-E. Research on Segregation in High-Strength Mg-Al Alloys. (In German.) G. Siebel. *Metall,* v. 6, Feb. 1952, p. 64-69.

Development of the forgeable Mg alloys AZ855 (7.0-7.5% Al, 1.0-1.5% Zn, 0.1% Mn). These alloys can be forged most economically when cast by the continuous process in which most nonmetallic and excess metallic compounds are segregated. Photographs, photomicrographs, diagrams, and tables. 10 ref. (E25, F22, Mg)

227-E. Experiences and New Information Concerning Aluminum Chill Casting. Gustav Lauterjung. (In German.) *Metall,* v. 6, Mar. 1952, p. 129-133.

Examples in precision casting and the casting of bulky pieces. Data are charted. (E23, Al)

228-E. Contribution to the Production of Cast Iron With Spheroidal Graphite. (In German.) Borut Marincek. *Von Roll Mitteilungen,* v. 10, June-Dec. 1951, p. 14-44.

The reactions taking place in molten cast iron. Experiments in the production of nodular cast iron by addition of pure Mg. The formation of nodular graphite and differences in the forms of graphite in cast iron are explained in terms of the surface tension of molten cast iron. Graphs, tables, diagrams, and photomicrographs. 25 ref. (E25, CI)

229-E. Centrifugal Casting. (In Swedish.) H. Jungbluth. *Gjuteriet,* v. 42, Jan. 1952, p. 1-10.

Mathematical and physical laws of centrifugal castings. Historical review; practical aspects of centrifugal casting of tubes, cylinder linings, and other tubular goods. Numerous diagrams, graphs, photographs, and micrographs. (E14)

230-E. Specifications for Pulverized Coal for Molds and Directions for Its Testing. (In Swedish.) *Gjuteriet,* v. 42, Jan. 1952, p. 13-14.

Developed by a Swedish committee on foundry molding materials. (E19)

231-E. Bonding Material for Small Castings; Surface Tension Bonds for Sand. W. A. Snyder. *American Foundryman,* v. 21, Mar. 1952, p. 38-41.

Experiments to produce molding-sand mixtures with suitable combinations of strength, permeability, and deformation for light molding, using only the surface tension of a fluid as a binder. (E18)

232-E. Pressure Casting Aluminum. *American Foundryman,* v. 21, Mar. 1952, p. 45-48.

Operations at Scientific Cast Products Co., Cleveland and Chicago, for making cast Al patterns and matchplates. (E16, Al)

233-E. Magnesite For Molding. S. G. Urane. *American Foundryman,* v. 21, Mar. 1952, p. 49-50.

Results of job-tested experiments show that magnesite can replace silica flour as a general mold and core wash and in treating facing sand to reduce its permeability. How to prepare the magnesite, properties, compounding techniques, and application methods for the wash; typical facing-sand mixtures, and helpful suggestions on sound practice. (E18)

234-E. Clay Determination Procedure Improved; Testing Sand With Included Combustibles. *American Foundryman,* v. 21, Mar. 1952, p. 59.

The standard siphoning procedure for determining A.F.S. clay does not distinguish between mineral and combustible matter such as wood, flour, cereal, and sea coal. The test detailed here, however, determines clay in the presence of such organic material and is thus well suited for used molding sand. (E18)

235-E. Process and Product Advantages of Gray Iron Castings. C. O. Burgess. *American Foundryman,* v. 21, Mar. 1952, p. 60-64. (Condensed from "Advantages of the Gray Iron Casting Process and Products".)

See abstract from *Gray Iron Founders Society;* item 50-E, 1952. (E11, CI)

236-E. Core Removal and Cleaning of Castings by the Wet Process. W. Russell. *British Cast Iron Research Association Journal of Research and Development,* v. 4, Feb. 1952, p. 263-268; disc., p. 268-271.

Plant and equipment required, and the method of charging the castings into the cleaning chamber. A typical analysis of the blast sand, the molding sand, and reclaimed sand. Water reclamation plant. Illustrated. (E24, L10)

237-E. Some Experience With Cupola Spark and Dust Arresters. W. Y. Buchanan. *British Cast Iron Research Association Journal of Research and Development,* v. 4, Feb. 1952, p. 272-279; disc., p. 279-282.

Various types of impurities given off from cupola stack. Development and improvements in the design of wet spark arresters which have taken place in recent years, chiefly in America. In an early design of arrester, accelerated corrosion of the pipes took place due to concentrations of sulfur compounds in the circulated water. Means of minimizing the corrosion problem. (E10, R7)

238-E. Frequency Conversion Might Well Affect Melting Technique. J. Morgan. *Canadian Metals,* v. 15, Mar. 1952, p. 32.

Advantages of program being carried out in Ontario to convert from 25 to 60-cycle power. (E10)

239-E. Foundry Mechanization. Part 2. A. S. Beech. *Canadian Metals,* v. 15, Mar. 1952, p. 34, 36, 39.

Several British innovations that have been thoroughly tested. Presents criticism of American technique. (E general)

240-E. Valve Production at Crane. *Canadian Metals,* v. 15, Mar. 1952, p. 44, 46.

Foundry practice at Crane, Ltd., Montreal, Canada. Materials include brasses, cast irons, malleable iron, Ni-base alloys, and special alloy steels. (E11, CI, AY, Ni)

241-E. Ferranti Foundry; Innovations in Mechanized Production. V. C. Faulkner. *Foundry Trade Journal,* v. 92, Feb. 7, 1952, p. 139-144; Feb. 14, 1952, p. 165-168.

Layout at Ferranti Ltd., Lancashire, England. (E general)

242-E. Moulding in an Indian Foundry. S. G. Athanikar. *Foundry Trade Journal,* v. 92, Mar. 13, 1952, p. 271-277.

Equipment and procedures for production of large iron sand castings. (E11, CI)

243-E. Discussion on Cupola Practice. *Foundry Trade Journal,* v. 92, Mar. 13, 1952, p. 286-287, 290.

Presented at recent meeting of East Midlands branch, Institute of British Foundrymen. (E10, CI)

244-E. Machine Makes Cores Faster, Cheaper, Better. Herbert Chase. *Iron Age,* v. 169, Mar. 27, 1952, p. 93-97.

How complex cores can be rammed better, faster, and at lower cost in a new automatic coremaking machine in use at Buick. Only hand operations left are inserting wires where needed, putting driers in place, and transferring driers with cores to the baking-oven conveyer. Boxes, which may be cast iron or Al, are not touched by hand. Five table stations index smoothly through five stations. A modified Geneva indexing motion helps avoid shocks in accelerating and decelerating. (E21)

245-E. Electric Furnaces for Melting of Nonferrous Metals. G. H. Clamer. *Journal of the Electrochemical Society,* v. 99, Mar. 1952, p. 65C-68C.

A review. (E10, C21, EG-a)

246-E. Fundamental Study of Precision Casting. I. Experiments on Bronze Casting. (In Japanese.) Kazuo Katori, Tsuneyuki Okakura, and Yotaro Shindo. *Journal of Mechanical Laboratory,* v. 5, Nov. 1951, p. 312-319.

The lost-wax process was studied. Several beeswax patterns cast in a $CaSO_4$ mold were investigated. Coat-

ing and investment materials were natural and heat treated silica sands. Bonding material was a solution of hydrolyzed ethyl silicate. A standard gunmetal was poured. (E15, Cu)

247-E. The Osborn-Shaw Process of Precision Casting. *Machinery* (London), v. 80, Mar. 20, 1952, p. 506-507.

Experimentally developed and tested over a period of five years by Shaw Processes Ltd., Newcastle-Upon-Tyne, and employed for full-scale commercial production in a specially equipped precision foundry. Work already undertaken has included the casting of machine parts to an accuracy of 0.005 in., and production of dies for die casting, stamping, forging and extrusion, and for glass, rubber, and plastics. Materials already cast with success include Al and Mg alloys, brasses and bronzes, Fe, carbon steels, stainless steel, high-alloy steels, Steelite, Vitallium, and tungsten hard-facing alloys.
(E15, Al, Mg, Cu, Fe, CN, SS, AY, W)

248-E. The Impending Revolution in Casting Processes. H. H. Harris. *Metal Progress,* v. 61, Mar. 1952, p. 65-69.

Developments in the arts and sciences in casting of metals and their possible and probable benefit to defense and the national economy. Dimensional accuracy, chemistry-structure relationship, and tooling for improved quality and quantity with respect to the need for elevating the casting industry to higher levels of application and service.
(E general)

249-E. An Unusual Tin Bronze Casting. Harold J. Roast. *Metal Progress,* v. 61, Mar. 1952, p. 76-79.

Operations at Baldwin-Lima-Hamilton Corp., Eddystone, Pa., for making a tin bronze pump casing. The furnace, metal, mold, cooling period, cleaning and testing. (E11, Cu)

250-E. Resin Binders for Foundry Sand. *Metal Progress,* v. 61, Mar. 1952, p. 126-127.

See abstract of "Synthetic Resins in the Foundry", by P. G. Pentz, *Metal Industry;* item 385-E, 1951. (E18)

251-E. Large Castings; Berkeley Foundry Plays Large Part in Synthetic Rubber Picture. *Western Machinery and Steel World,* v. 43, Mar. 1952, p. 99.

Sand casting of drum shells for filters used in synthetic-rubber plants. (E11, CI)

252-E. Use of Machine-Poured Pig Iron. Remelting Tests on Hematite Pig Iron Cast in Sand and Automatically. (In Italian.) A. Scortecci, W. Demicheli, M. Drufuca, and A. Palazzi. *Metallurgia Italiana,* v. 44, Feb. 1952, p. 55-72; disc., p. 72.

Automatic pouring of pig iron, its advantages and disadvantages. Methods and results of experiments carried out on a commercial scale in a blast furnace and in a cupola to compare mechanical properties and microstructures of cast iron obtained from two kinds of pig iron differing only in the method of pouring. Tables, micrographs, charts, and diagrams. 16 ref. (E23, CI)

253-E. Production of Quality Cast Tools. (In Russian.) P. S. Pershin and B. A. Alekseev. *Stanki i Instrument,* v. 22. Aug. 1951, p. 22-25.

The casting of special high speed steel tools. (E11, TS)

254-E. Gates and Heads for Steel Castings. John Howe Hall. *Foundry,* v. 80, Mar. 1952, p. 112-115, 257-258; Apr. 1952, p. 104-107, 255-257.

Use of the Washburn or necked-down head. Center-line shrinkage in steel castings and methods of securing directional solidification. How to employ padding and metal chills in order to obtain directional solidification of steel castings. 29 ref. (E22, CI)

255-E. Casting Steel in Dry Sand Molds. Samuel R. Robinson. *Foundry,* v. 80, Apr. 1952, p. 170-171.

Recommended procedure followed by a Midwest steel foundry. They differ somewhat from orthodox practice. Diagrams. (E11, CI)

256-E. Experimental Production of Nodular Graphite in Cast Iron. Alexander I. Krynitsky and Harry Stern. *Foundry,* v. 80, Apr. 1952, p. 98-99, 241, 243-244, 246-247, 249.

Effect of treatment with FeS, B, MgO, magnesite, Ca and Ni-Cr-Mo on the graphite structure of cast iron. Photomicrographs and tabular data. 17 ref. (E25, M27, CI)

257-E. Design of Gray Iron Castings. Thomas E. Eagan. *Foundry,* v. 80, Apr. 1952, p. 108-110, 261, 263.

Factors involved with respect to the best and simplest design to attain required properties. (E11, CI)

258-E. Connor-Block Feeder; Simplified Universal Application by Means of an Oil-Sand Core. H. London, D. Neill, and J. C. Dowie, *Foundry Trade Journal,* v. 92, Mar. 6, 1952, p. 243-247.

Constructional details for forming a Connor-block and runner—a slit runner abutting onto the edge of a casting—by means of an oil-sand core. Through this feeder block and runner, metal from the downgates flows into the mold and in doing so heats adjacent corner edges of sand and thus promotes directional solidification and feeding from the reservoir contained in the "block." Application of this method to a pinion blank, a strickled mold, and to dry-sand work, as well as full particulars of metal and sands used. (E22)

259-E. Further Mechanical Aids for the Foundry. A. S. Beech. *Foundry Trade Journal,* v. 92, Mar. 13, 1952, p. 279-283; Mar. 27, 1952, p. 331-335. (A condensation.)

Innovations that have taken place since 1942, with special reference to the mass-production plant of British Railways at Horwich; light, medium, and heavy foundries; and strides that have been made in semi-mechanization of the jobbing foundry. (E general)

260-E. Experiences With the Investment Casting Process. D. F. B. Tedds. *Foundry Trade Journal,* v. 92, Mar. 20, 1952, p. 297-310.

Possibilities and limitations. Special components cast on an experimental basis were burner stems, pitot combs and tubes, and combustion chambers for turbine engines. Such production aspects as injection dies, wax-pattern production, molding and investing, secondary investment, alternative bonds, compacting, drying and firing, high-temperature oven, casting, and inspection and technical control. Tabular data on defects. (E15)

261-E. Swarf Melting in the Cupola. *Foundry Trade Journal,* v. 92, Mar. 20, 1952, p. 313-314.

Two methods of swarf melting as a conservation measure, one being to charge swarf as it comes from the machine-shops directly into the cupola. The second consists of first briquetting the swarf by mixing with cement and allowing it to harden into blocks before charging to the cupola. The 1st method was adopted because it is cheaper, although it has a higher melting loss. (E10, A8, CI)

262-E. Origin of Porosity in Castings of Magnesium-Aluminum and Other Alloys. E. J. Whittenberger and F. N. Rhines. *Journal of Metals,* v. 4, April 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 194, 1952, p. 409-420.

The formation of casting porosity is viewed as a nucleation and growth process with solidification shrinkage and gas precipitation as cooperative driving forces. Experimental evidence evaluating the individual contribution of each force confirms the major premise that microporosity is nucleated by gas precipitation. Effects of identity and quantity of gas, temperature range of freezing; and of freezing rate upon amount and distribution of porosity in light-metal castings. Graphs, sketches and microradiographs. 17 ref. (E25, N12, Mg, Al)

263-E. Degassing With Lithium. *Metal Industry,* v. 80, Mar. 7, 1952, p. 191-192.

Experiments made to obtain a more efficient and reliable method of degassing Cu and Ni alloys under existing melting conditions, and cleaner metal after deoxidation. One of the several findings of this investigation was the possibilities and merits of the use of Li metal. The best average addition is 0.005% Li added immediately before casting and after deoxidation had been carried out with 0.08% Mg. Alloys treated and notes on type of casting produced. (E25, Cu, Ni)

264-E. Spheroidal-Graphite Cast Iron for Crankshafts. *Metal Progress,* v. 61, Apr. 1952, p. 126-128, 146, 148. (Condensed from "Cast Iron Crankshafts, With Special Reference to Acicular and Spheroidal-Graphite Cast Irons", A. B. Everest.)

Previously abstracted from *Foundry Trade Journal.* See item 101-E, 1952. (E general, T21, CI)

265-E. An Appraisal of the Shell Molding Process. Harold J. Roast. *Metal Progress,* v. 61, Apr. 1952, p. 71-74.

The process, requirements, molding and casting procedure. (E11)

266-E. Size Classification and Permeability of Foundry Sands. (In French.) Philippe Jasson. *Fonderie,* v. 73, Feb. 1952, p. 2795-2804.

Calculation of the theoretical specific surface of a sand, determination of its fineness-permeability relation, experimental verification of this relation, and some of its practical applications. Tables and charts. (E18)

267-E. Improved Cupolas. (In French.) Gabriel Joly. *Fonderie,* v. 73, Feb. 1952, p. 2805-2809.

Improvements made in cupolas with respect to balancing the blast, reheating the air, and oxygen enrichment of the air. Tables and diagrams. (E10)

268-E. Device Enabling Casting by One Person. (In French.) *Fonderie,* v. 73, Feb. 1952, p. 2810-2814.

Device contains a ladle and its weighing mechanism, suspension straps, a system for lifting from the ladle, protection apparatus, and a movable trolley on a single-rail track. (E23)

269-E. Note on the Deoxidation of Brasses. (In French.) *Fonderie,* v. 73, Feb. 1952, p. 2818-2819.

Additions of silica and phosphorus. Data are tabulated. (E25, Cu)

270-E. History of Aluminium-Alloy Casting. *Foundry Trade Journal,* v. 92, Mar. 6, 1952, p. 251-254.

Discussion of above paper by A. P. Fenn (Feb. 28 issue; see item 524-E, 1951.) (E25, Q general, Al)

Be Sure to Go—

34th National Metal Exposition and Congress

Philadelphia, Oct. 20-24, 1952

F

PRIMARY MECHANICAL WORKING

102-F. Trostre Works; a Description of the Rolling Mills and Accessory Plant. J. S. Gazard and Garnet E. Jones. *Sheet Metal Industries,* v. 29, Mar. 1952, p. 198-210.

Layout, continuous pickler, 5-stand tandem cold mill, electrolytic cleaning, annealing, gas plant, temper mills, electrolytic tinning, etc., at above plant of Steel Co. of Wales. (F23, L13, L17, J23, ST)

103-F. Steel Extruding Puts the Squeeze on Conventional Forming. H. J. Altwicker and K. F. Braeuninger. *Steel,* v. 130, Mar. 17, 1952, p. 88-90.

A versatile extrusion process which produces a variety of shapes with no more than a change of dies. A comparison of mechanical properties of some extruded and rolled materials. (F24, Q general, ST)

104-F. Fundamentals of Building; How Plates and Steel Shapes Are Rolled. *Steelways,* v. 8, Mar. 1952, p. 16-17.

Illustrations and brief descriptions. (F23)

105-F. Surface Conditioning of Structural Steel. R. E. Somers and H. C. von Blohn. *Welding Journal,* v. 31, Mar. 1952, p. 193-198.

Conditioning methods applied by Bethlehem to structural shapes after rolling, such as grinding, chipping, and welding. Relative applications of each. Stresses conditioning by welding. (F29, G18, K general, CN)

106-F. Calculation of Intermediate Measurements When Drawing on Multiple Drawing Machines. (In German.) Karl Schemmer. *Archiv für das Eisenhüttenwesen,* v. 22, Nov.-Dec. 1951, p. 367-370.

Three main types of above equipment, and how to make the necessary calculations. Includes graphical interpretation. (F28)

107-F. Does New Process Challenge Foundries? Lorne Frame. *Canadian Metals,* v. 15, Mar. 1952, p. 28-29.

Cored forging and pressing, described as bridging the gap between sand and die casting. The process is of potential importance to manufacturers of aircraft parts, valve and plumbing fixtures, automobiles, gears, fire-fighting equipment, fuse components, lock hardware, electrical fittings, and many others. (F22)

108-F. Model Mill Rolls Model Rail. Dillon Cox and W. P. Wallace. *Iron Age,* v. 169, Apr. 3, 1952, p. 140-141.

Rolling mill which cold rolls model railroad rail in four passes. Mechanical properties of SAE 1020 wire and rail. (F23, Q general, CN)

109-F. High Temperature — High Speed Heating for Steel Rounds. A. F. Kritscher. *Iron and Steel Engineer,* v. 29, Mar. 1952, p. 55-60; disc., p. 60-62.

Application of principles of high-speed heating to new types of heating units, used prior to the seamless tubemaking process, for economy in heating and better quality of product. A number of new heating principles have been developed. New barrel-type furnace of National Tube Div., U. S. Steel Co. Heating-rate graphs for stainless and carbon steel rounds. (F21, CN, SS)

110-F. Operating and Economic Aspects of High Speed Tandem Cold Reduction Mills. F. K. Schefe. *Iron and Steel Engineer,* v. 29, Mar. 1952, p. 103-107; disc., p. 107-108.

A general discussion as applied to sheet steel production. (F23, CN)

111-F. The Hot-Forging of Metals. H. K. Breton. *Machinery* (London), v. 80, Mar. 6, 1952, p. 410-414.

General discussion includes the difference between impact extrusion and hot forging. Clarified by diagrams. (F22, G5)

112-F. Defects in Rolled Products. *Metal Progress,* v. 61, Mar. 1952, p. 98, 100, 102, 104. (From Report No. 193, Subcommittee on Rolling, *Verein Deutscher Eisenhüttenleute,* by Paul Grüner and T. Bruggeman.)

Identifies and groups defects into: material defects which originate in the melting shop; defects which arise in the rolling mill; and defects which can be remedied through a definite heat treatment in the rolling mill. (F23, ST)

113-F. Plug-In Induction Heating. B. E. McArthur. *Steel,* v. 130, Apr. 7, 1952, p. 118-119.

60-cycle power provides compact induction-heating unit for extrusion of nonferrous billets. Requires no motor-generator set. (F21, EG-a)

114-F. Modern Metallurgical Trends in the Production of Steel Plates. W. Barr. *West of Scotland Iron and Steel Institute Journal,* v. 58, 1950-51, p. 1-10.

Present status with respect to compositions, mechanical properties, and fabrication methods. Use of a low-alloy, high-tensile, weldable steel seems to be the trend, in order to obtain required properties plus a substantial reduction in plate thickness. (F23, CN, AY)

115-F. Production of Bolts and Nuts. A. P. Newall. *West of Scotland Iron and Steel Institute Journal,* v. 58, 1950-51, p. 49-62; disc., p. 62-64.

Development of mass-production methods of bolt-and-nut manufacture, especially by cold upsetting or hot forging. Physical and metallurgical characteristics required. Application of high-frequency heating in forging and heat treatment. (F22, J2, CN)

116-F. The Manufacture of Seamless Steel Tubing in Australia. J. Porteous. *Australasian Institute of Mining and Metallurgy, Proceedings,* new ser., Mar. 31-June 30, 1947, p. 181-203.

Important processes, and the essential differences between the various methods of rotary and nonrotary piercing, with their accompanying processes of elongation. Principles of the push-bench process are sketched. (F26, ST)

117-F. Steel Wire. F. Jenks. *Australasian Institute of Mining and Metallurgy, Proceedings,* new ser., Mar. 31-June 30, 1947, p. 337-358.

Manufacturing, properties, and uses. Graphed and tabulated data. (F28, CN)

118-F. H-P H-T Pipe Dreams Come True. Dawson Powell. *Power,* v. 96, Apr. 1952, p. 73-79.

Manufacture of main-steam piping for New England Power Co.'s Salem Harbor Station. Includes forging, heat treatment, boring, bending, ultrasonic inspection, and arc welding. Material is 2¼% Cr, 1% Mo steel. (F26, AY)

119-F. The Manufacture and Use of Fourdrinier Wire Cloth. A. G. Hose and J. P. Johnson. *Wire and Wire Products,* v. 27, Mar. 1952, p. 249-254, 313.

The exacting requirements of this specialized type of wire and the product into which it is made. Wire production and weaving. Alloys used are phosphor bronzes with 7-8% Sn, 0.2-0.3% P, balance Cu. (F28, G6, T29, Cu, Sn)

120-F. (Book) Extrusion of Plastics, Rubber, and Metal. Herbert R. Simonds, Archie J. Weith, and William Schack. 454 pages. 1952. Reinhold Publishing Corp., 330 W. 42nd St., New York, N. Y. $10.00.

About two-thirds of the material is devoted to extrusion of plastics. One chapter (45 pages) on metal extrusion, direct, indirect, and impact. Procedures for various metals. (F24, G5)

G

SECONDARY MECHANICAL WORKING

175-G. Impact Extrusion of Magnesium. T. L. Patton. *Machine Design,* v. 24, Mar. 1952, p. 225-226, 228. (A Condensation.)

Advantages of the process over other processes such as drawing. Operations involved. (G5, Mg)

176-G. Tools for the Impact Extrusion of Magnesium. George H. DeGroat. *Machinery* (American), v. 58, Mar. 1952, p. 162-167.

Tools and methods used. Design details for various examples. (G5, Mg)

177-G. Forming Sheet Metal With Low-Cost Tools. J. A. Whittingham. *Machinery* (American), v. 58, Mar. 1952, p. 186-191.

Flat sheet metal parts with flanges, holes, and other irregularities are formed in hydraulic presses using a rubber pad and form blocks. Recent advances in this method of forming have considerably reduced secondary manual operations. Some of these tooling improvements and an ingenious press arrangement employed in this process. (G8, ST)

178-G. New Production Facilities; a Brief Survey of the Machine-Tool Industry Today. Ralph J. Kraut. *Mechanical Engineering,* v. 74, Mar. 1952, p. 212-214, 218.

Background and functions of the machine-tool industry in peace and war, status of America's machine-tool equipment, and the machine tool of yesterday, today, and tomorrow.(G17, A4)

179-G. Plastic and Metal Shaping Operations Affect Tube Socket Design. Floyd McKnight. *Modern Industrial Press,* v. 14, Mar. 1952, p. 26, 28, 32.

The application of a plastic, "Kel-F" and silver-plated beryllium copper and phosphor bronze in the production of a socket for a transmitter tube. (G general, T1, Cu)

180-G. Method of Machining Carbide Die for Odd-Shaped Powder Part Illustrates New Way of Cutting Hard Materials. John S. Roller. *Precision Metal Molding,* v. 10, Mar. 1952, p. 47-50.

The electromechanical system of metal removal known under the trade name "Method X". (G17, C-n)

181-G. Some Practical Hints on Special Die Design. Federico Strasser. *Sheet Metal Industries,* v. 29, Mar. 1952, p. 230-234, 236.

Practical suggestions and simple solutions to problems encountered in practice as an aid in designing and building special cutting dies. Diagrams. (G general, T5)

182-G. Electrolytic Grinding: Stubborn Alloys Less Formidable. George Keeleric. *Steel,* v. 130, Mar. 17, 1952, p. 84-86.

The principles of removing stock by electrochemical action are applied successfully to the grinding of difficult-to-machine metals and metal carbides. Surface finish is excellent. (G18, C-n, SG-m)

183-G. The Renaissance in Metal Cutting. Milton C. Shaw. *Technology Review,* v. 54, Mar. 1952, p. 245-247, 264, 266, 268.

Research techniques for studying the metal-cutting process. Tool wear, plastic deformation, and metallography. (G17, M27, SG-m)

184-G. Oxygen Cutting of Defense Equipment Materials. A. H. Yoch. *Welding Journal,* v. 31, Mar. 1952, p. 217-229.

Setting up procedures or standards of control in order to secure the most satisfactory results for oxygen cutting of rolled alloy-steel plates, forgings, and castings on a production basis. Tabular data. (G22, AY)

185-G. Possibilities for Prestressing of Metallic Structures. (In French.) W. Soete. *Revue de la Soudure; Lastijdschrift,* v. 7, no. 4, 1951, p. 205-213.

See abstract from *Transactions of the Institute of Welding;* item 123-G, 1952. (G23, ST)

186-G. Methods of Investigating the Machinability of Metals. (In French.) Leon Czaplicki. *Revue universelle des Mines, de la Métallurgie des Travaux publics, des Sciences et des Arts appliqués a l'Industrie,* ser. 9, v. 95, Feb. 1952, p. 33-43.

Three possible types of chips. Mathematical analysis of the cutting phenomenon made by Merchant. Different methods of investigation. Micrographs, diagrams and tables. (G17)

187-G. The Lapping Process. (In German.) Hans H. Finkelnburg. *Metalloberfläche,* ser. A, v. 6, Jan. 1952, p. A9-A14.

Modern lapping practice and lapping machines. Diagrams, photographs, and graphs. (G19)

188-G. Economical Cleaning by Grinding of Round Parts Before Galvanizing. (In German.) W. Hofmann. *Metalloberfläche,* ser. B, v. 4, Jan. 1952, p. B1-B5.

Efficient methods. (G18, ST)

189-G. Oxygen Cutting During Preparation of Welded Structures for Building Construction. (In Russian.) M. M. Sakhovskii. *Avtogennoe Delo,* v. 22, July 1951, p. 19-22.

Experiments were made on the influence of oxygen cutting on the properties of edges and welded joints. A universal pattern for semiautomatic cutting. Deformation during cutting, preparation of edges, and organization of working area. (G22, T26, CN)

190-G. Testing the Durability of Cutting Tools Without Use of Laboratory Cutting Machines. (In Russian.) M. N. Nikolaichik. *Stanki i Instrument,* v. 22, June 1951, p. 18-20.

A formula was developed for evaluating cutting tools on the basis of factory data. Results are tabulated and charted. (G17)

191-G. Economic Aspects of Cutting Tool Life. H. J. Burmester. *Engineers' Digest,* v. 13, Feb. 1952, p. 45-49. (From *Werkstatt und Betrieb,* v. 84, Nov. 1951, p. 512-516.)

A thorough analysis. Economic implications of cutting-tool life rather than cutting conditions. (G17, TS)

192-G. New Machine Forms Jet Rings. *Iron Age,* v. 169, Mar. 27, 1952, p. 106-107.

New machine called a radial draw former forms rings by taking partially preformed strip, sheet, or plate, putting it in tension between two jaws, then wrapping it around a die. Little or no finish machining is required. Varied shapes may be formed. (G4)

193-G. Trepanning Makes Holes Faster. F. W. Lucht. *Iron Age,* v. 169, Apr. 3, 1952, p. 132-134.

See abstract of "Carbide Trepanning Accurate Bores in Record Time", *Steel;* item 198-G, 1952. (G17)

194-G. New Gas Cutting Techniques and Heavy Scrap Reduction. R. F. Helmkamp and A. H. Yoch. *Iron Age,* v. 169, Apr. 3, 1952, p. 135-137.

New technique utilizes an old gas cutting machine to reduce heavy scrap loaded on flat cars. (G22, ST)

195-G. Fabricating Titanium. *Modern Metals,* v. 8, Mar. 1952, p. 21-23.

Experimental results obtained by Ryan Aeronautical Co., San Diego, Calif., in exploring titanium's suitability for high-temperature applications in aircraft. (G general, T24, Al)

196-G. Cutting Fluid Chemical Adheres to Metal. C. L. Davis. *Screw Machine Engineering,* v. 8, Apr. 1952, p. 60-63.

General Aniline and Film Corp. has developed a new type coolant which is said to provide good lubricity between cutting edge and workpiece, resist rancidity, and provide good antirust qualities. Contains new active ingredient which possesses an extremely strong affinity for metal surfaces. (G21)

197-G. Precision Spinning; Solves Ticklish Forming Problem. Bernard Blackman. *Steel,* v. 130, Mar. 24, 1952, p. 68-69.

Process by which perfect spherical segments for dials on aircraft gyro indicators are mass produced from Al by combining watchcase spinning techniques and die stamping. (G13, Al)

198-G. Carbide Trepanning Accurate Bores in Record Time. Fred W. Lucht. *Steel,* v. 130, Mar. 31, 1952, p. 74-75.

Rapid process which removes most of the inside diameter as a solid core instead of chips. Present boring machines can be converted for trepanning operations. (G17)

199-G. Shaping, Finishing Horizons Widen. *Steel,* v. 130, Apr. 7, 1952, p. 120, 140, 143, 144.

Electromechanical, electrochemical, and ultrasonic processes for shaping and finishing hard-to-work materials in addition to conserving limited supplies of diamond bort. Eight specific operations where new processes for machining and grinding may be needed are emphasized. (G17, G18)

200-G. Specialty Die Designs for Stamping and Forming. Part I. The Marform Process. Lester F. Spencer. *Steel Processing,* v. 38, Mar. 1952, p. 121-127.

Application to miscellaneous ferrous and nonferrous metals and alloys. Recommended dimensions are tabulated. (G1)

201-G. Electro-Mechanical Machining of Hard Materials. Malcolm F. Judkins. *Tool Engineer,* v. 28, Apr. 1952, p. 48-50.

Conventional processes, and arc disintegration, electrolytic spark, and electromechanical machining, and their applications. (G17, TS, C-n, SG-m)

202-G. Giants for Cutting. *Welding Engineer,* v. 37, Apr. 1952, p. 35.

Multiple-torch flame-cutting machines at the Manitowoc Shipbuilding Co., Manitowoc, Wis. Each has a 16-ft. wide cutting table, a travel of 25 ft. lengthwise, and will do both straight-line and shape cutting. (G22, CN)

203-G. Progressive Die With Dial Transfer Device. *Machinery* (London), v. 80, Feb. 21, 1952, p. 331-333.

Developed for production of stampings designed to hold 35-mm. film. (G3)

204-G. QM Group Inspects Crown Stove Works. *Better Enameling,* v. 23, Mar. 1952, p. 8-15.

Picture story of miscellaneous equipment and procedures used in stove fabrication at Cicero, Ill., plant. Includes presswork, shearing and trimming, machining, drilling, welding, enameling, assembly, etc. (G general, K general, L26, CN)

205-G. Evaluating Machinability of Rolled Steels, Forgings, Cast Irons. Michael Field and Norman Zlatin. *Canadian Metals,* v. 15, Apr. 1, 1952, p. 40-42.

Examples of procedures on several representative problems arising in industry are cited to illustrate the approach in evaluating machinability. Low carbon steels with S added, medium alloy carbon steels, automotive steel forgings, and cast iron. Tabular data. (G17, CN, AY, CI, SG-k)

206-G. Conserve Diamond Bort and Cut Hard-To-Machine Materials With New Machining Processes. *Journal of Metals,* v. 4, Apr. 1952, p. 378-380.

New processes including electrolytic, electric-spark, electric-arc, and ultrasonic methods for shaping and finishing cemented-carbide tools and tungsten carbide projectile cores. (G17, C-n)

207-G. How to Cut Heavy Steel Sections. *Linde Tips and Oxy-Acetylene Tips,* v. 31, Apr. 1952, p. 29-31.

How to cut heavy steel sections with a hand-cutting blowpipe. (G22, ST)

208-G. Basic Forming Techniques for the Copper Base Alloys. Part I. Lester F. Spencer. *Tool Engineer,* v. 28, Apr. 1952, p. 56-59.

Includes tabular data on composition; and on mechanical, physical, and fabrication properties. (To be continued.) (G general, Q general, P general, Cu)

209-G. (Book) Increased Production, Reduced Costs Through a Better Understanding of the Machining Process and Control of Materials, Tools, Machines. Vol. 2. 196 pages. 1951. Curtiss-Wright Corp., Wood-Ridge, N. J.

Concentrates on one aspect—the effect of microstructures of plain carbon, alloy, and stainless steels on tool life. Includes effects of machining practice on residual stress and endurance limit; recent developments in the machining of Ti and its alloys. Numerous micrographs, charts, and tables. (G17, M27, ST, Ti)

H

POWDER METALLURGY

37-H. Powder Metallurgy; a Review of the Literature and Recent Russian Work. *Chemical Age,* v. 66, Mar. 1, 1952, p. 345-347. (H general)

38-H. Electrodeposition of Metal Powders; the Significance of Diffusion Processes at the Cathode. (In German.) *Helvetica Chimica Acta,* v. 35, Feb. 1, 1952, p. 363-374.

Reviews the problem on the basis of the literature. The role of current density, transition time, and conditions existing when vertical electrodes are used. 90 ref. (H10)

39-H. Continuous Quality Control in Hard-Metal Production. (In German.) H. Franssen. *Metall,* v. 6, Jan. 1952, p. 12-21.

A review and tabulation on the basis of the literature, organizing the data according to composition of the materials, which include ceramics, carbides, refractory metals, graphite, ceramic-metal composi-

tions (cermets), etc. Production methods (including powder metallurgy); test methods; and mechanical, physical, and chemical properties. 49 ref.
(H general, C-n, SG-m)

40-H. Technique of Hot Pressing of Metal Carbides; A Semi-Automatic Hot Press. (In German.) J. Rietveld. *Metall*, v. 6, Feb. 1952, p. 81-82.
Effects of various factors on the process; equipment required.
(H14, C-n)

41-H. Magnetic Observation of the Diffusion During Sintering of a Nickel-Copper Alloy. (In German.) Werner Köster and Josef Raffelsieper. *Zeitschrift für Metallkunde*, v. 42, Dec. 1951, p. 387-391.
Investigated by means of a magnetic method of analysis. Details of the experiments, such as establishment of sintering isotherms and observation of activation energy. Data are charted. (H15, N1, Ni, Cu)

42-H. The Sintering of Tungsten Carbide Plus Cobalt Cermets as a Surface Reaction. (In German.) Walther Dawihl. *Zeitschrift für Metallkunde*, v. 43, Jan. 1952, p. 20-22.
Investigations concerning the difference in the effect of Co, Ni, and Fe as auxiliary metals on the sintering of tungsten carbide. Reasons for the superior effect of Co in comparison with Ni; the inferiority of Fe. Data are tabulated.
(H15, Co, W, C-n)

43-H. Some Properties of Engineering Iron Powders. C. J. Leadbeater, L. Northcott and F. Hargreaves. "Powder Metallurgy", His Majesty's Stationery Office (London), 1951, p. 33-74.
Previously abstracted from *Iron & Steel Institute*, Special Report 38, 1947. See item 5b-11, 1948.
(H11, P general, Q general, Fe)

44-H. Production of Iron Powder by Electrodeposition. G. E. Gardam. "Powder Metallurgy", His Majesty's Stationery Office (London), 1951, p. 75-84.
Previously abstracted from *Iron and Steel Institute*, Special Report 38, 1947. See item 5b-10, 1948.
(H10, Fe)

45-H. German Sintered Iron Bearings. L. Northcott and C. J. Leadbeater. "Powder Metallurgy", His Majesty's Stationery Office (London), 1951, p. 85-90.
Specimens of ferrous bearings and of some associated material from a German ¾-track vehicle were examined and features of design observed. Composition, physical, and mechanical properties were determined.
(H general, P general, Q general, Fe)

46-H. Trials of Sintered Iron Driving Bands for 20-Mm Oerlikon Ammunition. L. Northcott and B. D. Burns. "Powder Metallurgy", His Majesty's Stationery Office (London), 1951, p. 91-102.
Preparation of rings under different conditions of compacting pressures and sintering temperatures; determination of mechanical properties, density and microstructure; and banding and firing trials to determine the functioning of the bands in the 20-mm. Oerlikon gun. Comparative tests were made with bands incorporating paraffin wax. Powder used was reduced FeO_2 (mill scale) type. Further developments include determination of influence of sintered iron bands on gun wear.
(H general, Q general, P10, M27, Fe)

47-H. Sintered Iron-Copper Compacts. L. Northcott and C. J. Leadbeater. "Powder Metallurgy", His Majesty's Stationery Office (London), 1951. p. 103-117.
Previously abstracted from *Iron and Steel Institute*, Special Report 38, 1947. See item 5C-16, 1948.
(H15, Q general, Fe, Cu)

48-H. An Aluminium Alloy Made by Powder Metallurgy. R. L. Bickerdike. "Powder Metallurgy", His Majesty's Stationery Office (London), 1951, p. 119-128.
Previously abstracted from *Iron and Steel Institute*, Special Report 38, 1947. See item 5d-1, 1948.
(H general, P10, Q27, Q29, Al, Cu)

49-H. Notes on German Developments in Non-Carbide Powder Metallurgy (1939-1945). C. J. Leadbeater. "Powder Metallurgy", His Majesty's Stationery Office (London), 1951, p. 129-151.
Previously abstracted from *Iron and Steel Institute*, Special Report 38, 1947. See item 5a-23, 1948.
(H general, Fe, ST, Cu, Mo, Al)

50-H. The Synthesis, Fabrication, and Properties of Beryllium Carbide. John H. Coobs and Walter J. Koshuba. *Journal of the Electrochemical Society*, v. 99, Mar. 1952, p. 115-120.
Methods that have been used in synthesizing beryllium carbide. Physical and chemical properties. Physical properties of fabricated beryllium carbide-base bodies, and the effects of graphite or beryllium oxide additives on properties of the bodies are disclosed.
(H general, Be, C-n)

51-H. The Sintering of Copper-Zinc Powder Compacts. D. D. Howat, R. L. Craik, and J. P. Cranston. *Journal of the Institute of Metals*, v. 80, Mar. 1952, p. 353-361.
Data obtained by differential thermal analysis, together with changes in volume and in electrical resistivity, may be taken as criteria of the sintering and alloying processes occurring when compacts of Cu and Zn powders are heated. Effects of particle size and compacting pressure on the mechanism were also investigated. (H15, H11, Cu, Zn)

52-H. Biaxial Pressing of Powdered Materials. (In Russian.) I. A. Leskovich. *Izvestiia Akademii Nauk SSSR*, Section of Technical Sciences, Aug. 1951. p. 1230-1233.
The distribution of stresses in metallic and nonmetallic powder compacts in relation to composition and shape factors. Experimental data are charted for some organic and inorganic compounds. (H14)

53-H. The Manufacture of Tungsten Powder and Ferro-Silicon at the Works of the Broken Hill Pty. Company Limited, New Castle. I. H. Carne. *Australasian Institute of Mining and Metallurgy, Proceedings*, new ser., Mar. 31-June 30, 1947, p. 1-14.
Manufacture, properties and applications. (H general, W, Fe-n)

54-H. Sintered Titanium Carbide. Frank W. Glaser and W. Ivanick. *Journal of Metals*, v. 4, Apr. 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 387-390.
A pressure-sintering method was used to produce binder-free and very dense TiC specimens. Some physical and mechanical properties of these TiC bodies were determined and found to compare favorably with those of certain cemented TiC grades. The hot transverse rupture strength of TiC bodies remained substantially the same regardless of the amount or type of binder material used.
(H15, P general, Q general, Ti, C-n)

55-H. (Book) **Powder Metallurgy.** 159 pages. 1951. His Majesty's Stationery Office, London W.C.2, England. (Selected Government Research Reports, v. 9).
Consists of ten reports (some published previously in *Iron and Steel Institute*, Special Report 38, 1947.) Each report is separately abstracted.
(H general)

56-H. (Book) **Treatise on Powder Metallurgy. Vol. III.** Claus G. Goetzel. 899 pages. 1952. Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y. $22.00.
A classified, annotated, and indexed bibliography of 6330 items, both literature references and patents. (H general)

J HEAT TREATMENT

97-J. Surface-Hardening Machine. *Engineering*, v. 173, Feb. 29, 1952, p. 268-269.
Equipment utilizes an oxygen-fuel gas mixture. (J28)

98-J. Induction Heater for Surface Hardening. *Engineering*, v. 173, Feb. 29, 1952, p. 286-287.
Equipment used to harden certain types of steel shafts. (J2, ST)

99-J. Flame Hardener Treats Cams at High Speeds. W. G. Patton. *Iron Age*, v. 169, Mar. 20, 1952, p. 98-99.
How automatic-transmission cams are flame hardened at close to 550 pieces per hr. on an automatic machine at Buick Motor Div. After loading, the operator starts the automatic hardening cycle. Oxygen-propane flame brings cams to heat. Parts are dropped into the oil quench, then conveyed out of machine and deposited in tote pans. Parts are fabricated from SAE 1062 and 4063 steel. (J2, CN, AY)

100-J. Files and Tools; Advantages of Heat Treatment in Salt Baths. D. Thomas. *Iron & Steel*, v. 25, Mar. 1952, p. 85-88.
General advantages of salt-bath heat treatment; recent developments in salts produced for specific purposes; the technique; appropriate equipment; and particular advantages of each process. (J2, TS)

101-J. General Considerations on Suspended Arches and on Flame Undulations. (In French.) Louis Gascuel. *Métallurgie et la Construction méchanique*, v. 84, Feb. 1952, p. 111, 113.
A particular type of construction and its advantages when used in annealing furnaces for steel billets and blooms. Schematic diagrams.
(J23)

102-J. Accuracy of Statistical Methods for the Computation of Carbon-Penetration Depths in Carburized Bars. (In German.) Hans Schrader. *Archiv für das Eisenhüttenwesen*, v. 22, Nov.-Dec. 1951, p. 411-415.
Critical discussion of a statistical computation method advanced by A. Slattenschek. The various discrepancies in the method are indicated, tabulated, and charted. (J28, ST)

103-J. The Effect of Alloy Elements on the Heat Treatment of Grey Cast Iron. M. M. Hallett. *Alloy Metals Review*, v. 8, Mar. 1952, p. 2-8.
Reviews the above; their effects on hardness and tensile strength. 30 ref. (J general, Q27, Q29, CI)

104-J. Bright Annealing Copper in Continuous Controlled Atmosphere Furnace. J. H. Bradley. *Canadian Metals*, v. 15, Mar. 1952, p. 56, 58.
Except for loading and unloading, continuous furnace operation in bright annealing copper is fully automatic at Canada Wire and Cable Co. plant. Diagram. (J23, Cu)

105-J. Flame Hardening. N. H. Cuke. *Canadian Metals*, v. 15, Mar. 1952, p. 62-64.
Its advantages as applied to steels

and cast irons. Portable standard equipment is used for operating in shop or field. (J2, CI, ST)

106-J. Production Heat Treatment of Ross Automatic Steering Assemblies. George Goepfert. *Industrial Heating,* v. 19, Mar. 1952, p. 408-410, 412, 414, 416, 418, 420, 422, 424, 571.

Equipment and procedures of Ross Gear & Tool Co., Lafayette, Ind. Plain carbon and low-alloy steels are used. (J general, AY)

107-J. Special Gas-Fired Stress-Relieving Furnaces Used in Manufacture of Large Processing Equipment. *Industrial Heating,* v. 19, Mar. 1952, p. 462, 464, 466, 468, 470, 572-573.

Procedures and equipment at Wyatt Metal & Boiler Works in Houston and Dallas, Texas. Products include pressure vessels and other equipment for the petroleum industry, stainless steel and nickel items for the chemical industry, various types of tanks, towers, blast-furnace equipment, etc. (J1)

108-J. Close-Tolerance Steel Parts Austempered Without Distortion. John Kolb. *Iron Age,* v. 169, Apr. 3, 1952, p. 142-144.

Modified austempering process, using automatic, continuous salt baths and conveyer system worked out so that 4140 steel for rocket motors can be machined in the annealed condition before hardening. Each rocket motor body is subjected to 25,000-psi. hydrostatic tests, followed by final inspection for mechanical tolerances. (J26, AY)

109-J. Hardenability as the Criterion for Selecting Boron Steels. H. B. Knowlton. *Materials & Methods,* v. 35, Mar. 1952, p. 84-87.

Proper choice and use of boron steels depends to a great extent on understanding the effects of heat treating and case hardening on hardness, toughness, and fatigue properties. Data are charted. (J26, Q general, AY)

110-J. Tentative Hardenability Bands for New Boron Steels. *Materials & Methods,* v. 35, Mar. 1952, p. 123.

Tables and graphs. (J26, AY)

111-J. New Flame-Hardening Technique; Oxy-Town-Gas Heating With Automatic Control. *Metal Treatment and Drop Forging,* v. 19, Mar. 1952, p. 113-114.

Flame-hardening machine which can be developed in various designs for handling specific parts; also miliscope temperature-control mechanism. (J2, CN)

112-J. Induction Hardening of Crankshaft Journals; New Equipment Speeds Production at the Sheffield Works of Ambrose Shardlow & Co. Ltd. Tom Bishop. *Metal Treatment and Drop Forging,* v. 19, Mar. 1952, p. 131-134.

(J2, ST)

113-J. Heat Treatment for Rope Wires. Richard Saxton. *Mining Magazine,* v. 86, Mar. 1952, p. 146-148.

The patenting process, cleaning and drawing operations, and mechanical test procedures. (J25, F28, CN)

114-J. Closer Hardenability Control for Silicon-Chromium Steel. B. C. Schott and S. Isenberg. *Steel,* v. 130, Apr. 7, 1952, p. 114-115.

Various tests were run on experimental heats of Si-Cr valve steel. Results reveal that hardenability decreases as Si content increases. Photomicrographs, graphs, and tabbles. (J26, AY)

115-J. Dutch Reader Comments on "Influence of Microstructure on Heat Treating and Machining". W. J. van den Bergh. *Steel Processing,* v. 38, Mar. 1952, p. 139-140, 146-147.

Critical comments on article by Pliny J. Wilson (Nov. issue.) Discussion of the letter by Howard E. Boyer is also included. (J general, M27, G17, ST)

116-J. Rohr Gets Accurate Temperature Control of Aluminum Alloys by Solution Heat Treating. W. H. Wynne. *Western Metals,* v. 10, Mar. 1952, p. 32-33.

Tables give recommended temperature range for solution heat treating of Al alloys, and suggested soaking time for solution treatment of wrought alloys (excluding forgings). (J27, Al)

117-J. The Formation of Cracks During Heat Treatment of Tools. (In Russian.) A. P. Guliaev and S. P. Yakushev. *Stanki i Instrument,* v. 22, Aug. 1951, p. 26-27.

Data are charted and discussed. (J general, TS)

118-J. Measurement of Case Depth. James Sorenson and Alfred Hendrickson. *American Machinist,* v. 96, Mar. 31, 1952, p. 129.

A table which can be used for establishing values for routine checking of carburized case depths on individual gears and similar parts after carburizing and hardening. (J28, CN, AY)

119-J. Metal Processing at Subzero Temperatures. G. B. Olson and H. T. Gregg, Jr. *Heating and Ventilating,* v. 49, Apr. 1952, p. 83-87.

Commercial equipment which is now available for producing temperatures as low as −200° F., has made possible an increased use of subzero temperatures for processing metals. Various applications of low temperature in this field. (J2)

120-J. Automotive Steering Gear Assemblies Present Heat Treating Problems. George Goepfert. *Industrial Gas,* v. 30, Mar. 1952, p. 13-15, 22-25, 27.

See abstract of "Production Heat Treatment of Ross Automatic Steering Assemblies", *Industrial Heating.* See item 106-J, 1952. (J general, AY)

121-J. Influence of Temperature, Gas Composition and Flow on Carbo-Nitrided Cases. W. H. Holcroft and D. J. Schwalm. *Metal Progress,* v. 61, Apr. 1952, p. 89-93.

Substantiates some of the theories of carbonitriding by reporting certain laboratory and production experiences. Deals with effect of NH_3 on case properties; of rate of flow; of CO-CO_2 equilibrium; and of temperatures above 1450° F. (J28, ST)

122-J. Influence of Surface Condition on Quenching Rates. *Metal Progress,* v. 61, Apr. 1952, p. 162, 164, 166, 168, 170, 172. (Translated and condensed from "The Influence of Surface Conditions of Metals on the Cooling Rates in Liquid Quenchants", Walter Peter.)

Previously abstracted from *Archiv für das Eisenhüttenwesen.* See item 28-J, 1951. (J2, Fe)

K

JOINING

234-K. Induction Brazes Squirrel Cage. P. H. Brace and E. B. Fitzgerald. *American Machinist,* v. 96, Mar. 17, 1952, p. 124-125.

High-power generator, a new powdered flux, and a simple set-up combine to braze copper bars to rotor rings automatically in a 4-min. operation. An "unbrazing" technique was also developed. (K8, Cu)

235-K. Carbon Black Flocculation in Rubber to Metal Cements. G. M. Sheehan, Gerard Kraus, and A. B. Conciatori. *Industrial and Engineering Chemistry,* v. 44, Mar. 1952, p. 580-582.

The function of carbon black in cements for adhering rubber to metal. Cements containing GR-S and carbon black as the main constituents considerably increase adhesion of rubber to brass and to steel coated with various resinous primers, provided the carbon black is strongly flocculated. Data are tabulated. 11 ref. (K11, ST, Cu)

236-K. How to Weld Monel, Nickel and Inconel. *Industry & Welding,* v. 25, Feb. 1952, p. 41-42.

Fabrication of pipe, tubes, and wrought welded fittings of Ni and high-Ni alloys. (K general, Ni)

237-K. Titanium Aids Silver Brazing. Arnold S. Rose. *Iron Age,* v. 169, Mar. 20, 1952, p. 96-97.

Nonbrazing qualities of Ti have proved helpful in silver soldering a type 321 stainless steel assembly in fused KCl-NaCl bath. Ti strips around the assembly act as dams and hold the silver solder in place. The salt bath operates at 1350° F. Rings must be replaced after 25 hr. exposure. (K8, T5, SS, Ti)

238-K. Production Problems. XIII. Welding of Tractor Steering Wheels. *Iron & Steel,* v. 25, Mar. 1952, p. 89-92. (Concluded).

Detailed results of the examination of defective joints. Photomicrographs. (K general, Q general, CN)

239-K. Welded Gear Blanks. Kenneth N. Mills. *Machine Design,* v. 24, Mar. 1952, p. 141-142, 194.

Typical blanks consist of a medium-carbon (SAE 1045) steel rim, structural steel plate webs, and a low-carbon steel hub, joined by submerged-arc welding. (K1, CN)

240-K. Discussion on Resistance Welding. H. E. Dixon and H. G. Taylor. *Sheet Metal Industries,* v. 29, Mar. 1952, p. 249-254.

Discussion of paper presented at the annual conference of the Sheet and Strip Metal Users' Technical Association, published in the Dec. issue of *Sheet Metal Industries* (item 62-K, 1952). (K3)

241-K. Bigger Welders Do Bigger Job. *Steel,* v. 130, Mar. 17, 1952, p. 91-92.

Technical advances in special extra-large-size spot welding equipment developed by Ryan Aeronautical Co. Advantages and examples. (K3)

242-K. Fabrication of Chemical Plant. *Welding and Metal Fabrication,* v. 20, Mar. 1952, p. 82-90.

Welding and construction procedures at a British plant. Includes miscellaneous forming and welding procedures on a variety of equipment, much of it of stainless steel. (K general, G general, T29, SS, ST)

243-K. Industrial Brazing. Part 3. Heating Methods and Equipment. E. V. Beatson and H. R. Brooker. *Welding and Metal Fabrication,* v. 20, Mar. 1952, p. 103-109.

Carbon resistance heating, electrode carbons, direct interface resistance heating, electrode materials for interface resistance brazing, gas-fired salt baths, and electrically heated salt baths. Diagrams, graphs, and tabular data. (K8)

244-K. Practical Aspects of Welding and Metalworking. *Welding and Metal Fabrication,* v. 20, Mar. 1952, p. 113-114.

The welding of galvanized metals by either metallic-arc or carbon-arc welding. (K1, CN, Zn)

245-K. Projection Welding of Steel in Heavy Gages and in Dissimilar Thicknesses. Ernest F. Nippes and John M. Gerken. *Welding Journal,* v. 31, Mar. 1952, p. 113s-124s; disc., p. 124s-125s.

Effects of weld current, weld time, electrode force, and projection dimensions on weld formation and weld quality in projection welding. Graphs and tabular data. (K3, ST)

246-K. Welded Joints Between Dissimilar Metals in High Temperature Service. R. W. Emerson and W. R. Hutchinson. *Welding Journal,* v. 31, Mar. 1952, p. 126s-141s.

Effects of time and temperature on the structural stability of welded joints between austenitic and ferritic steels using austenitic electrodes. Test plates were tested for mechanical properties after specific heat treatments and metallographic observations. Graphs and photomicrographs.
(K1, Q general, M27, SS, AY)

247-K. Investigation of Factors Which Determine Performance of Weldments. R. H. Aborn. *Welding Journal,* v. 31, Mar. 1952, p. 141s, 160s.

Discussion of paper by C. E. Hartbower and W. S. Pellini, published in Oct. 1951 issue (item 621-K, 1951). (K9, Q26, ST)

248-K. Seam Welding Containers Automatically. R. H. Blair. *Welding Journal,* v. 31, Mar. 1952, p. 207.

A discussion of paper by C. S. Seltzer, Sept. 1951 issue (item 563-K, 1951). (K3, CN)

249-K. Schlieren Analysis of Inert-Gas Arc Shields. W. B. Moen and G. J. Gibson. *Welding Journal,* v. 31, Mar. 1952, p. 208-213.

The schlieren method of making gas flow patterns visible was applied to a comparison study of He and A as arc shields with non-consumable electrode equipment. Results indicate that either gas will provide adequate coverage and the choice of gas depends only upon the desired electrical characteristics and economics. The schlieren apparatus. (K1)

250-K. Resistance and Fusion Welding of Titanium and Its Alloys. E. F. Holt and W. H. Moore. *Welding Journal,* v. 31, Mar. 1952, p. 213-216.

Some preliminary data on properties of Ti and its alloys; techniques for spot, flash, and inert-arc welding. Tabular data and photomicrographs. 14 ref.
(K1, K3, Q general, Ti)

251-K. Flash Butt Welding of High-Temperature Alloys. I. A. Oehler. *Welding Journal,* v. 31, Mar. 1952, p. 230-232.

Flash-butt welding, a common high-production method of joining carbon steels, is readily applicable to joining of the various heat resistant alloys and nonferrous materials used in jet-engine production. Electrical and mechanical requirements for various joint sections. Typical flash welding specifications covering certification of equipment and production control. (K3, SG-h)

252-K. Welding of High Heat-Resistant Materials. J. L. Solomon. *Welding Journal,* v. 31, Mar. 1952, p. 233-238.

See abstract of "Welding Jet Engine Parts of Heat Resistant Metals," J. L. Solomon, *Automotive Industries;* item 210-K, 1952.
(K general, CN, Ni, Ti, SS, Al)

253-K. New-Type Aluminum Hatch Covers Fabricated by Sigma Welding. W. F. Ruehl. *Welding Journal,* v. 31, Mar. 1952, p. 240-241.
(K1, Al)

254-K. Butt Welding of Rail Joints. (In French.) Ed. Henrion. *Revue de la Soudure; Lastijdschrift,* v. 7, no. 4, 1951, p. 195-204.

Recommended procedures, using the oxy-acetylene torch. (K2, CN)

255-K. Welding and Brazing of Gray Iron Castings. (In French and German.) Hans Spycher. *Zeitschrift für Schweisstechnik; Journal de la Soudure,* v. 42, Jan. 1952, p. 7-12.

Various types of operations suitable for the repair of gray-iron castings. The method varies according to the part to be repaired. Details concerning the material and the procedure. (K general, CI)

256-K. Welding of Rails in the Swedish State Railways. (In French and German.) S. E. Schäder and S. E. Jönsson. *Zeitschrift für Schweisstechnik; Journal de la Soudre,* v. 42, Jan. 1952, p. 1-4; Feb. 1952, p. 23-32.

Training and examinations required for the welders, and the types of welding done. Methods of operation. (K1, CN)

257-K. The Present Status of Electric Resistance Welding. (In German.) E. Rietsch. *Schweissen und Schneiden,* v. 3, Dec. 1951, p. 376-382.

Modern equipment, particularly spot welding machines, seam welders, butt welders, and electrode materials. Operation of the machines. 10 ref. (K3)

258-K. Welding in Machine Construction. (In German.) F. W. Griese. *Schweissen und Schneiden,* v. 4, Jan. 1952, p. 6-18.

Wide possibilities for use of welding to achieve cost reduction. Photographs and diagrams. 10 ref.
(K general)

259-K. Calculation and Design of Welded Structures. (In German.) K. H. Effertz. *Shcweissen und Schneiden,* v. 4, Jan. 1952, p. 19-21; Feb. 1952, p. 56-58.

First articles of a series. Numerous diagrams. (K general, T26)

260-K. Development of Electrodes for Welding of Austenitic Steels for High-Pressure Boilers. (In German.) E. Kauhausen and H. A. Vogels. *Schweissen und Schneiden,* v. 4, Feb. 1952, p. 35-40.

Development of an austenitic electrode, free of ferrite, which can be used for welding even very thick sheets. With respect to heat resistance, intercrystalline corrosion, and embrittlement resistance, these welds are of the same quality as the base material. Tables, charts, and photographs. (K1, SS)

261-K. The Soldering of Aluminum. (In German.) L. Rostosky and H. Klein. *Schweissen und Schneiden,* v. 4, Feb. 1952, p. 42-45.

Various brazing and soldering methods for aluminum in industrial and household applications.
(K7, K8, Al)

262-K. Reactance Load and Connected Load of Arc Welding Transformers. (In German.) E. Bergmann. *Schweissen und Schneiden,* v. 4, Feb. 1952, p. 45-50.

Possibility of further development of arc welding transformers. A review of various types shows the effects they have on the operation, as well as the technical possibilities which have already been explored. Schematic diagrams. (K1)

263-K. Progress in the Field of Welding and Cutting: Present Status of Welding Technique in the Soviet Union. (In German.) O. Vollenbruck. *Schweissen und Schneiden,* v. 4, Feb. 1952, p. 58-61.

A review on the basis of the literature. Types of welding, of testing, and methods for prevention of cracking. 20 ref. (K general, G22)

264-K. The Production of Chains With Aid of Electric Resistance Welding. (In German.) W. Püngel. *Schweisstechnik,* v. 5, Nov. 1951, p. 121-124.

Advantages of the method; emphasizes particularly the application to chains made of special steels. Micrographs, photographs, and schematic drawings. (K3, ST)

265-K. Solid Ceramic Fluxes for Automatic Welding. (In Russian.) K. K. Khrenov and D. M. Kushnerev. *Avtogennoe Delo,* v. 22, June 1951, p. 1-4.

A series of fluxes which are particularly useful for welding corroded surfaces and for welding or building up low-alloy steels. (K1, AY)

266-K. Influence of Variations in the Composition of High-Manganese Flux on Its Properties. (In Russian.) K. V. Liubavskii and M. M. Timofeev. *Avtogennoe Delo,* v. 22, June 1951, p. 5-9.

Investigation was applied to welding of carbon steels. Compositions of the fluxes and deposits are tabulated. Effects of various compositions. (K1, CN)

267-K. Adherence of Slag Scale to the Surface of the Metal Seam During Welding Under Flux. (In Russian.) D. M. Rabkin, Iu. N. Gotal'skii, E. S. Kudelia, and V. V. Podgaetskii. *Avtogennoe Delo,* v. 22, June 1951, p. 10-14.

Causes of slag adherence to carbon steels were investigated. Crystal structures of the flux and of the oxidized surface of the metal. Data are tabulated and illustrated. 15 ref. (K1, M26, CN)

268-K. Investigation of a Standard Series of Tips for Welding Torches. (In Russian.) V. D. Nechaev. *Avtogennoe Delo,* v. 22, June 1951, p. 14-18.

Characteristics and capacities of a matched series of welding tips. Data are tabulated and charted. (K2)

269-K. Electric-Arc Welding With a Bundle of Electrodes. (In Russian.) V. S. Volodin. *Avtogennoe Delo,* v. 22, June 1951, p. 18-21.

Method of welding carbon steels. The use of two or three electrodes at once resulted in increased production and better welds. Results are tabulated and illustrated. (K1, CN)

270-K. Phenomenon of Strengthening of Welds in the Production of Electrically Welded Tubes. (In Russian.) N. Z. Pertsovskii. *Avtogennoe Delo,* v. 22, June 1951, p. 21-23.

Experimental tubes were prepared from two types of low-carbon strip steel by electric-arc welding. Mechanical properties of the strip and of the finished tubes were determined. Heat treatments for producing uniform properties in the tube were established. Data are charted. (K1, Q general, J general, CN)

271-K. New Type of Electrodes With Improved Technological Properties for Welding Stainless Steel. (In Russian.) A. A. Erokhin. *Avtogennoe Delo,* v. 22, July 1951, p. 4-9.

A new stainless steel welding electrode was investigated under various conditions. Results are tabulated, charted, and illustrated. 14 ref. (K1, SS)

272-K. Automatic Welding of Tubes Without Rotation. (In Russian.) A. S. Fal'Kevich, A. G. Mazel, and Ia. E. Rogachevskii. *Avtogennoe Delo,* v. 22, July 1951, p. 912.

Equipment for automatic butt welding of steel pipelines. Illustrations, tables, and graphs. (K1, CN)

273-K. Contact Welds With the Aid of Stored Kinetic Energy. (In Russian.) S. V. Shablygin. *Avtogennoe Delo,* v. 22, July 1951, p. 12-16.

Equipment and applications. Data are tabulated and illustrated. Includes circuit diagrams and oscillograms. (K1)

274-K. Certain Characteristics of Sources of Heat for Welding Thin Steel Sheets. (In Russian.) A. Ia. Brodskii. *Avtogennoe Delo,* v. 22, July 1951, p. 16-18.

The heating capacity and distribution of heat for Argon-arc, atomic-hydrogen, and oxy-acetylene welding of 18-8 sheet steel were determined. Data are charted. (K1, K2, SS)

275-K. Deformation of Columns of High Buildings During Welding. (In Russian.) D. P. Lebed and I. S. Miroshnichenko. *Avtogennoe Delo,* v. 22, July 1951, p. 22-24.

Because of the difficulty of calculating deformation, it is recommended that, after welding, the warped flanges of beams be cut off so that they will not interfere during assembly. The amount of warpage was found to be proportional to the amount of deposited metal. (K1, T26, CN)

276-K. Testing the Eccentricity of the Coatings of Electrodes. (In Russian.) L. O. Sokolovskii. *Avtogennoe Delo,* v. 22, July 1951, p. 25-26.

Describes and diagrams apparatus. (K1, T5)

277-K. Shielded Arc Welding Process Saves Defective Copper Molds. E. H. Frail. *American Foundryman,* v. 21, Mar. 1952, p. 44.

The welding of voids found when machining water-cooled Cu molds. The particular arc-welding process employed uses a consumable electrode shielded by argon. No flux is required, resulting in the formation of welds of high purity. Process can be used on practically all commercial metals. (K1, E12, Cu)

278-K. No More Riveting? *Architectural Forum,* v. 96, Mar. 1952, p. 120-121, 160.

Merits of riveting, bolting, and welding in building construction. (K general, T26, CN)

279-K. Welding of Machinery, Pressure Vessels and Piping. R. E. Lorentz, Jr. *Combustion,* v. 23, Mar. 1952, p. 42-45.

Reviews formulation of welding codes. Various welding procedures, and inspection methods. Metallurgical considerations. (K general, ST)

280-K. Dip-Soldering Techniques. *Electronics,* v. 25, Apr. 1952, p. 236, 238, 240.

Procedure used in electron tube fabrication at the Chatham Electronics plant, Newark, N. J. and at the CBS-Columbia plant, Brooklyn, N. Y. (K7)

281-K. Welding Stainless Steels Without Carbide Precipitation. J. A. Goodford and D. W. Kaufmann. *Industry & Welding,* v. 25, Mar. 1952, p. 31-32, 73.

Ways of rapid cooling of heat-affected zone promptly after welding to reduce chances of subsequent intergranular corrosion. (K general, SS, Cr)

282-K. How to Weld Alloy Piping. *Industry & Welding,* v. 25, Mar. 1952, p. 39-40, 74-75.

Recommended procedures for metallic and inert-arc welding and oxy-acetylene welding of pipe, tubes, and wrought welded fittings of Monel, Inconel and nickel. (K1, K2, Ni)

283-K. Huge Fabricated Weldments. Willard W. Wakefield. *Industry & Welding,* v. 25, Mar. 1952, p. 43, 46, 78-79.

Production of beds and platens for special 2500-ton hydraulic presses at Bruce-Macbeth Engine Co., Cleveland. (K1, T5, CN)

284-K. Effects of Moisture in Electrode Coatings. *Industry & Welding,* v. 25, Mar. 1952, p. 48-49, 51, 84-87; Apr. 1952, p. 35-36, 38, 69-70, 72.

Open forum discussion by six outstanding welding authorities. (K1)

285-K. Fundamental Facts About Brazing Fluxes. *Industry & Welding,* v. 25, Mar. 1952, p. 54-56, 59-61, 95.

Types, functions, purpose, properties, performance, and precautions. (K8)

286-K. Fabricated Steel Girders—New Trend? J. B. McCormick. *Industry & Welding,* v. 25, Mar. 1952, p. 63-64, 96-97.

Manufacture of prefabricated all-welded tapered steel girders at Ross-Carter Corp., North Hollywood, Calif. The metal-arc welding torch is rapidly replacing the riveting gun, and sometimes the saw and hammer. (K1, T26, CN)

287-K. How Welding "Keeps 'Em Flying" for the Navy. Howard E. Jackson. *Industry & Welding,* v. 25, Apr. 1952, p. 42-43, 45-46, 73.

Various welding processes, testing and inspection procedure at Overhaul and Repair Dept. of U. S. Naval Station, Seattle, Wash. Materials used include Al, Mg, and various steels. (K general, T24, Al, Mg, ST)

288-K. Mine Maintenance Welding for High Productive Time. James Hyslop. *Industry & Welding,* v. 25, Apr. 1952, p. 54-56, 59, 74-77.

Selection of steels and their properties. (K general, T28, CN, AY)

289-K. Latest Developments in Weld Repairing of Steel Castings. R. A. Willey. *Industry & Welding,* v. 25, Apr. 1952, p. 60-62, 65-68.

(K general, CI)

290-K. Ultrasonics Make Soldering Easier. *Iron Age,* v. 169, Mar. 27, 1952, p. 105.

The method is said to be effective with metals such as Al which have chemically inactive oxides and are difficult to solder using ordinary flux methods. (K7)

291-K. Weldments Find Increased Use in Gear Drives. C. J. Schorsch and Robert Hirsch. *Iron and Steel Engineer,* v. 29, Mar. 1952, p. 122, 126, 128.

Experience at United Engineering & Foundry Co., Pittsburgh, Pa., indicates that several cast steel elements can be fused into sturdy and rigid structures by arc welding, instead of using gray iron castings. (K1, CI)

292-K. Measurement of Heat Generated Between the Base Metal and the Electrode in Arc Welding. (In Japanese.) Yutaka Imai and Toshiaki Hagiwara. *Journal of Mechanical Laboratory,* v. 5, Nov. 1951, p. 290-293.

Results of experimental and theoretical investigation for various types of electrodes. Compares American and Japanese types. Apparatus is diagrammed; results are tabulated. (K1)

293-K. The Application of Ultrasonic Soldering Techniques. Alan E. Crawford. *Light Metals,* v. 15, Mar. 1952, p. 102-104.

Apparatus and procedure developed by Mullard, Ltd., in Britain, for ultrasonic soldering of Al and its alloys. Mg and Be cannot be soldered satisfactorily as yet. (K7, Al)

294-K. Welding and Brazing Seamless Nickel Tubing. *Machinery* (London), v. 80, Mar. 6, 1952, p. 426-429.

Methods recommended by International Nickel Co. Tables and graphs. (K general, Ni)

295-K. Fluorocarbon Plastics Bonded to Metals and Rubbers to Provide New Composite Materials. *Materials & Methods,* v. 35, Mar. 1952, p. 96-97.

Properties and applications of Teflon (Du Pont) and Kel-F (M. W. Kellogg Co.). (K11)

296-K. How to Select Brazing and Soldering Materials. H. R. Clauser. *Materials & Methods,* v. 35, Mar. 1952, p. 105-120.

Types, characteristics, and uses of available brazing and soldering materials. The selection problem; brazing alloys and fluxes; soft solders and fluxes; and brazing alloys and solders for various metals. (K7, K8, T5, SG-f)

297-K. Metal Stitching Speeds Aluminum Door Assembly. *Modern Metals,* v. 8, Mar. 1952, p. 36.

By replacing drilling and riveting with metal stitching at Romfohr Overhead Door Co., Portland, Ore. they have increased production rates 30%, cut fastener costs about 75%, and reduced labor costs more than 65%. (K13, Al)

298-K. Adhesives for Metals. K. S. Meakin. *Research,* v. 5, Mar. 1952, p. 126-132.

Development of adhesives, and their application for joining metal under the critical conditions required by modern aeronautical practice. (K12, Al)

299-K. Higher Tensile Short-Link Steel Chain and Chain Slings. W. Gibson Biggart. *Transactions of Institution of Engineers & Shipbuilders in Scotland,* v. 95, Part 3, 1951-52, p. 149-176; disc., p. 176-180.

Problems arising from the manufacture of high-tensile-strength chain by resistance welding and flash-butt welding. Mechanical properties and some suggestions for increasing safe working loads. Assembly of all-steel slings, using atomic-hydrogen welding for joining links. (K3, K1, Q27, CN)

300-K. From Sheet Metal to Home Freezers. Clyde B. Clason. *Welding Engineer,* v. 37, Apr. 1952, p. 23-27.

Welding methods used for production of home freezers and related products. Includes spot welding, oxy-acetylene welding, braze welding, and silver brazing. (K general, CN)

301-K. Welded All the Way. A. G. Barkow. *Welding Engineer,* v. 37, Apr. 1952, p. 28-31.

Construction of the new 1400-mile Texas-to-Chicago 30-in. natural-gas pipeline. Welding problems and techniques. (K1, CN)

302-K. Convair's New Rectifier Welders. R. D. Leonard. *Welding Engineer,* v. 37, Apr. 1952, p. 32-34.

Construction and use of ten new three-phase machines with rectifiers providing d.c. for spot and seam welding of Al and stainless steel at Consolidated Vultee Aircraft Corp., San Diego, Calif. (K3, Al, SS)

303-K. Welded Aluminum Dump Truck Bodies. *Welding Engineer,* v. 37, Apr. 1952, p. 40-41.

Welding operations at Gar Wood Industries, Inc., Richmond, Calif. Inert-arc metal-arc welding was used. (K1, Al)

304-K. Aircomatic Welding for Fabricators. *Western Machinery and Steel World,* v. 43, Mar. 1952, p. 84-86, 110.

Applications of process to Al, stainless, Ni, Cu, and other hard-to-weld metals. (K1)

305-K. Sky-Beams; Spot Welds Reduce Weight. *Western Machinery and Steel World,* v. 43, Mar. 1952, p. 91-93.

Structural floor beams of remarkably high strength-weight characteristics are being fabricated with spot welding for use in the cargo-carrying floors of the Boeing C-97 Stratofreighter. Material is clad Al alloy. (K3, Al)

306-K. Joining and Assembly Techniques: Aircraft Bearing Retention and High Strength Fasteners. Thomas A. Piper. *Western Machinery and Steel World,* v. 43, Mar. 1952, p. 94-95.

Method developed at Northrop Aircraft. Roll swaging is used to form bearing retainers. (K13)

307-K. The Welding of Pressure Vessels. H. Harris. *West of Scotland Iron and Steel Institute Journal,* v. 58, 1950-51, p. 11-38; disc., p. 39-48.

Present stage of development in the manufacture of welded pressure vessels. The problems caused by the necessity of using heavy boiler plates. Inspection procedure. (K general, T26, ST)

308-K. Navy-Qualified Welders Produce Intricate Parts. H. J. Boll. *American Machinist,* v. 96, Mar. 31, 1952, p. 94-95.

Pictorial story of welding of special parts of Al, Mg, and carbon and alloy steel; inspection procedures. (K1, S13, Al, Mg, CN, AY)

309-K. Effect of Elongation on Weld Quality. R. G. Alison. *Canadian Metals,* v. 15, Apr. 1, 1952, p. 44-45.

Ability of the weld to elongate depends more on the surface condition of the weld than it does on the type of electrode used. (K1)

310-K. Hermetic Seals. R. O. McIntosh. *Electrical Manufacturing,* v. 49, Apr. 1952, p. 120-123, 328, 330, 332, 334.

Advantages and limitations of various methods for making sealed electrical connections to components that are protected from the atmosphere. Plastic and inorganic materials and the joining of insulator substances to metals. Design data. 12 ref. (K11)

311-K. Local Preheating by Induction in the Arc Welding of Steel Plate. L. N. Belov. *Engineers' Digest,* v. 13, Mar. 1952, p. 79-81. (Translated and condensed from *Avtogenno Delo,* Dec. 1951, p. 9-11.)

Conditions for proper operation including arc condition, flux density, inductor arrangement, and heating time. Simultaneous preheating and welding can be done. Diagrams and table. (K1, CN, AY)

312-K. Back to Work Because of Braze-Welding. *Linde Tips and Oxy-Acetylene Tips,* v. 31, Apr. 1952, p. 42-43.

Some repair jobs that put a useful and important piece of equipment back to work by braze-welding with an oxy-acetylene welding blowpipe. (K8)

313-K. Principles of Braze-Welding. *Linde Tips and Oxy-Acetylene Tips,* v. 31, Apr. 1952, p. 44.

Figures with descriptive captions. (K8)

314-K. How to Join Copper and Aluminum. Walter P. Hill *Refrigerating Engineering,* v. 60, Apr. 1952, p. 347-349, 412.

A series of tests and experiments conducted for a period of six years to develop a practical and foolproof production method for joining Cu and Al. (K general, Al, Cu)

315-K. A Survey of Modern Theory on Welding and Weldability. D. Seferian. *Sheet Metal Industries,* v. 29, Mar. 1952, p. 239-248, 254.

Arc welding electrodes. Functions of the electrode coating, electrical and physical action of the coating, slag analysis, types of slags, and refining of the metal. Micrographs. 18 ref. (To be continued.) (K1)

316-K. Seventy Years of Welding. Howard J. Thompson. *Transactions of the Institute of Welding,* v. 14, Dec. 1951, p. 195-200.

An illustrated review, with emphasis on welded heavy equipment. (K general)

317-K. All-Welded Plate Web Girder. D. H. McPherson. *Transactions of the Institute of Welding,* v. 14, Dec. 1951, p. 210.

Fabrication technique to avoid distortion with an unusually thin web. Diagrams. (K1, T26, ST)

318-K. Reports of International Commissions. *Transactions of the Institute of Welding,* v. 14, Dec. 1951, p. 211-215.

Reports of Commissions on electric arc welding, resistance welding, fatigue of welded structures, weldability, and brittle fractures. Presented at Oxford, England, July, 1951. (K general, Q23)

319-K. Welding Procedures for the Copper-Base Alloys. II. (Concluded.) Lester F. Spencer. *Welding Engineer,* v. 37, Apr. 1952, p. 42-46, 48.

Fusion welding of the various bronzes and of the alloys containing Ni. Resistance welding methods for Cu and all Cu-base alloys. Tables, photographs and 16 ref. (K general, K3, Cu)

320-K. "Contour" Arc Welding. F. J. Pilia. *Welding Engineer,* v. 37, Apr. 1952, p. 54.

New semi-automatic equipment permits welding contoured sheet-metal assemblies by a manual method affording advantages of mechanized welding. (K1)

321-K. Positioners Grow Bigger. *Welding Engineer,* v. 37, Apr. 1952, p. 56.

Positioners for weldments on a 70-ton hopper railroad car and a diesel A-frame. (K1, CN)

322-K. Synthetic Resin Glues: Preliminary Study of Factors Affecting the Strength of Glued Joints in Aluminium Alloys. "Adhesives", His Majesty's Stationery Office (London), 1951, p. 1-18. Based on report by W. J. Roff and K. W. Pepper.) (K12, Al)

323-K. (Book) **Adhesives.** 89 pages. 1950. His Majesty's Stationery Office, London W.C.2, England. (Selected Government Research Reports, v. 7.)

Includes factors affecting strength of glued joints in Al (synthetic resins). Pertinent individual papers are separately abstracted. (K12, Al)

324-K. (Book) **Arc Welding.** Charles H. Zielke. 63 pages. Bruce Publishing Co., Milwaukee 1, Wis. 80c.

General information on nature of welding and equipment, and definitions of important welding terms. Striking an arc, depositing string beads and parallel beads, effect of arc length, welding of various types of joints, welding of different metals such as light-gage steel, stainless, aluminum, etc. (K1)

325-K. (Book) **Encyclopaedia of Oxy-Acetylene Welding.** L. J. Tibbenham. 73 pages. Sir Isaac Pitman & Sons, Ltd., London; or British Book Centre, 122 E. 55th St., New York 22, N. Y. $2.50.

Information on all matters connected with oxy-acetylene welding presented in dictionary form. Tables of data required for welding operations. Photographs and drawings. (K2)

326-K. (Book) **Glass.** J. Home Dickson. 300 pages. 1951. Hutchinson's Scientific and Technical Publications, New York.

Includes a chapter on glass-to-metal seals. (K11)

327-K. (Book) **Handbook of Welded Steel Tubing.** 214 pages. 1948. Formed Steel Tube Institute, 1621 Euclid Ave., Cleveland, Ohio.

Factual data on welded steel tubing. General processes of fabrication, mechanical properties, and a variety of material such as mill practice and trade customs. Tabular data give standards of the industry and a compilation of engineering aids. (K general, F26, ST)

328-K. (Book) **Riveting Alcoa Aluminum.** 81 pages. 1951. Aluminum Company of America, Pittsburgh 19, Pa.

Revised edition. Riveting in general, types of heads, rivet alloys, aircraft riveting, etc. (K13, Al)

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CLEANING, COATING AND FINISHING

327-L. Strength of Surface Coatings. Henry Grinsfelder. *American Paint Journal,* v. 36, Mar. 24, 1952, p. 66-68, 70, 72, 74-79.

Some of the strength properties of film surfaces and film bodies were determined. Shows how these properties change as time of loading varies. (L26)

328-L. Metal-Finishing by Vacuum Evaporation; A Commercial Method for Finishing Jewelry. *Chemical Age,* v. 66, Mar. 1, 1952, p. 349-351.

Method developed by a British organization, and its applicability to various base metals and deposited metals. (L25)

329-L. Water Resistance of Coatings Containing Nitrogenous Resins. Henry Grinsfelder. *Industrial and Engineering Chemistry,* v. 44, Mar. 1952, p. 563-568.

Results of a study undertaken to determine the effect of the nitrogen resin, the alkyd resin, the curing conditions, and the pigment on the water resistance of baked finishes applied to metal surfaces. (L26, R4)

330-L. Some Contributions of the Petroleum Chemical Industry in the Surface Coatings Field. R. N. Wheeler. *Journal of the Oil & Colour Chemists' Association,* v. 35, Mar. 1952, p. 107-117.

Chemical reactions for various processes. Applications of epichlorohydrin resins in can coatings, wire enamels, and coatings for Al and light alloys. (L26)

331-L. Cleaning Work by Using Ultra High-Frequency Sound Waves. Charles R. Fay. *Machinery* (American), v. 58, Mar. 1952, p. 158-161.

How grease, oil, and fine particles of embedded dirt and lapping compound are quickly and easily removed from the precision metal shaving heads of Schick electric shavers by ultrasonic methods. (L10)

332-L. Metal Fabrication by Electroforming. Alan Whittaker. *Machinery* (London), v. 80, Feb. 28, 1952, p. 362-366.

Advantages and limitations of the graphite-coating, metal-powder, silver-reduction, and vacuum-sputtering methods of producing conductive layers on various types of surfaces. (L general)

333-L. Barrel Finishing at Eureka-Williams. Joe Reinholz. *Metal Finishing,* v. 50, Mar. 1952, p. 52-53, 62.

Finishing of numerous components fabricated by or purchased for use in vacuum cleaners or oil burners. (L10)

334-L. The Role of Chelating Agents in the Plating Industry. Harold Narcus. *Metal Finishing,* v. 50, Mar. 1952, p. 54-62.

The more familiar sequestering agents, the commercial chelating agents, and a comparison between the two. The present applications of chelating agents in the metal-finishing field. 13 ref. (L17)

335-L. Chemical Analysis and Control of Alkaline Metal Cleaners. K. E. Langford. *Metal Finishing,* v. 50, Mar. 1952, p. 66-71, 74.

Some control methods which can be used for various compositions and for proprietary cleaners of unknown composition. (L12)

336-L. Sprayed Aluminium-Base Coatings for Aluminium Alloys. F. A. Champion. *Metal Industry,* v. 79, Oct. 26, 1951, p. 355-358; Nov. 2, 1951, p. 384-385.

Laboratory salt-spray tests have shown that sprayed Al coatings provide a practical means of raising the corrosion resistance of Al alloy extrusions and castings which contain Cu as a major alloying constituent to the high level of clad strong alloy plate and sheet. For Al-Cu alloys, coatings of 99.5% purity provide adequate protection. Further work is required to develop a technique for spraying satisfactory coatings of higher purity. Application

275-K. Deformation of Columns of High Buildings During Welding. (In Russian.) D. P. Lebed and I. S. Miroshnichenko. *Avtogennoe Delo,* v. 22, July 1951, p. 22-24.

Because of the difficulty of calculating deformation, it is recommended that, after welding, the warped flanges of beams be cut off so that they will not interfere during assembly. The amount of warpage was found to be proportional to the amount of deposited metal. (K1, T26, CN)

276-K. Testing the Eccentricity of the Coatings of Electrodes. (In Russian.) L. O. Sokolovskii. *Avtogennoe Delo,* v. 22, July 1951, p. 25-26.

Describes and diagrams apparatus. (K1, T5)

277-K. Shielded Arc Welding Process Saves Defective Copper Molds. E. H. Frail. *American Foundryman,* v. 21, Mar. 1952, p. 44.

The welding of voids found when machining water-cooled Cu molds. The particular arc-welding process employed uses a consumable electrode shielded by argon. No flux is required, resulting in the formation of welds of high purity. Process can be used on practically all commercial metals. (K1, E12, Cu)

278-K. No More Riveting? *Architectural Forum,* v. 96, Mar. 1952, p. 120-121, 160.

Merits of riveting, bolting, and welding in building construction. (K general, T26, CN)

279-K. Welding of Machinery, Pressure Vessels and Piping. R. E. Lorentz, Jr. *Combustion,* v. 23, Mar. 1952, p. 42-45.

Reviews formulation of welding codes. Various welding procedures, and inspection methods. Metallurgical considerations. (K general, ST)

280-K. Dip-Soldering Techniques. *Electronics,* v. 25, Apr. 1952, p. 236, 238, 240.

Procedure used in electron tube fabrication at the Chatham Electronics plant, Newark, N. J. and at the CBS-Columbia plant, Brooklyn, N. Y. (K7)

281-K. Welding Stainless Steels Without Carbide Precipitation. J. A. Goodford and D. W. Kaufmann. *Industry & Welding,* v. 25, Mar. 1952, p. 31-32, 73.

Ways of rapid cooling of heat-affected zone promptly after welding to reduce chances of subsequent intergranular corrosion. (K general, SS, Cr)

282-K. How to Weld Alloy Piping. *Industry & Welding,* v. 25, Mar. 1952, p. 39-40, 74-75.

Recommended procedures for metallic and inert-arc welding and oxy-acetylene welding of pipe, tubes, and wrought welded fittings of Monel, Inconel and nickel. (K1, K2, Ni)

283-K. Huge Fabricated Weldments. Willard W. Wakefield. *Industry & Welding,* v. 25, Mar. 1952, p. 43, 46, 78-79.

Production of beds and platens for special 2500-ton hydraulic presses at Bruce-Macbeth Engine Co., Cleveland. (K1, T5, CN)

284-K. Effects of Moisture in Electrode Coatings. *Industry & Welding,* v. 25, Mar. 1952, p. 48-49, 51, 84-87; Apr. 1952, p. 35-36, 38, 69-70, 72.

Open forum discussion by six outstanding welding authorities. (K1)

285-K. Fundamental Facts About Brazing Fluxes. *Industry & Welding,* v. 25, Mar. 1952, p. 54-56, 59-61, 95.

Types, functions, purpose, properties, performance, and precautions. (K8)

286-K. Fabricated Steel Girders—New Trend? J. B. McCormick. *Industry & Welding,* v. 25, Mar. 1952, p. 63-64, 96-97.

Manufacture of prefabricated all-welded tapered steel girders at Ross-Carter Corp., North Hollywood, Calif. The metal-arc welding torch is rapidly replacing the riveting gun, and sometimes the saw and hammer. (K1, T26, CN)

287-K. How Welding "Keeps 'Em Flying" for the Navy. Howard E. Jackson. *Industry & Welding,* v. 25, Apr. 1952, p. 42-43, 45-46, 73.

Various welding processes, testing and inspection procedure at Overhaul and Repair Dept. of U. S. Naval Station, Seattle, Wash. Materials used include Al, Mg, and various steels. (K general, T24, Al, Mg, ST)

288-K. Mine Maintenance Welding for High Productive Time. James Hyslop. *Industry & Welding,* v. 25, Apr. 1952, p. 54-56, 59, 74-77.

Selection of steels and their properties. (K general, T28, CN, AY)

289-K. Latest Developments in Weld Repairing of Steel Castings. R. A. Willey. *Industry & Welding,* v. 25, Apr. 1952, p. 60-62, 65-68. (K general, CI)

290-K. Ultrasonics Make Soldering Easier. *Iron Age,* v. 169, Mar. 27, 1952, p. 105.

The method is said to be effective with metals such as Al which have chemically inactive oxides and are difficult to solder using ordinary flux methods. (K7)

291-K. Weldments Find Increased Use in Gear Drives. C. J. Schorsch and Robert Hirsch. *Iron and Steel Engineer,* v. 29, Mar. 1952, p. 122, 126, 128.

Experience at United Engineering & Foundry Co., Pittsburgh, Pa., indicates that several cast steel elements can be fused into sturdy and rigid structures by arc welding, instead of using gray iron castings. (K1, CI)

292-K. Measurement of Heat Generated Between the Base Metal and the Electrode in Arc Welding. (In Japanese.) Yutaka Imai and Toshiaki Hagiwara. *Journal of Mechanical Laboratory,* v. 5, Nov. 1951, p. 290-293.

Results of experimental and theoretical investigation for various types of electrodes. Compares American and Japanese types. Apparatus is diagrammed; results are tabulated. (K1)

293-K. The Application of Ultrasonic Soldering Techniques. Alan E. Crawford. *Light Metals,* v. 15, Mar. 1952, p. 102-104.

Apparatus and procedure developed by Mullard, Ltd., in Britain, for ultrasonic soldering of Al and its alloys. Mg and Be cannot be soldered satisfactorily as yet. (K7, Al)

294-K. Welding and Brazing Seamless Nickel Tubing. *Machinery* (London), v. 80, Mar. 6, 1952, p. 426-429.

Methods recommended by International Nickel Co. Tables and graphs. (K general, Ni)

295-K. Fluorocarbon Plastics Bonded to Metals and Rubbers to Provide New Composite Materials. *Materials & Methods,* v. 35, Mar. 1952, p. 96-97.

Properties and applications of Teflon (Du Pont) and Kel-F (M. W. Kellogg Co.). (K11)

296-K. How to Select Brazing and Soldering Materials. H. R. Clauser. *Materials & Methods,* v. 35, Mar. 1952, p. 105-120.

Types, characteristics, and uses of available brazing and soldering materials. The selection problem; brazing alloys and fluxes; soft solders and fluxes; and brazing alloys and solders for various metals. (K7, K8, T5, SG-f)

297-K. Metal Stitching Speeds Aluminum Door Assembly. *Modern Metals,* v. 8, Mar. 1952, p. 36.

By replacing drilling and riveting with metal stitching at Romfohr Overhead Door Co., Portland, Ore. they have increased production rates 30%, cut fastener costs about 75%, and reduced labor costs more than 65%. (K13, Al)

298-K. Adhesives for Metals. K. S. Meakin. *Research,* v. 5, Mar. 1952, p. 126-132.

Development of adhesives, and their application for joining metal under the critical conditions required by modern aeronautical practice. (K12, Al)

299-K. Higher Tensile Short-Link Steel Chain and Chain Slings. W. Gibson Biggart. *Transactions of Institution of Engineers & Shipbuilders in Scotland,* v. 95, Part 3, 1951-52, p. 149-176; disc., p. 176-180.

Problems arising from the manufacture of high-tensile-strength chain by resistance welding and flash-butt welding. Mechanical properties and some suggestions for increasing safe working loads. Assembly of all-steel slings, using atomic-hydrogen welding for joining links. (K3, K1, Q27, CN)

300-K. From Sheet Metal to Home Freezers. Clyde B. Clason. *Welding Engineer,* v. 37, Apr. 1952, p. 23-27.

Welding methods used for production of home freezers and related products. Includes spot welding, oxy-acetylene welding, braze welding, and silver brazing. (K general, CN)

301-K. Welded All the Way. A. G. Barkow. *Welding Engineer,* v. 37, Apr. 1952, p. 28-31.

Construction of the new 1400-mile Texas-to-Chicago 30-in. natural-gas pipeline. Welding problems and techniques. (K1, CN)

302-K. Convair's New Rectifier Welders. R. D. Leonard. *Welding Engineer,* v. 37, Apr. 1952, p. 32-34.

Construction and use of ten new three-phase machines with rectifiers providing d.c. for spot and seam welding of Al and stainless steel at Conselidated Vultee Aircraft Corp., San Diego, Calif. (K3, Al, SS)

303-K. Welded Aluminum Dump Truck Bodies. *Welding Engineer,* v. 37, Apr. 1952, p. 40-41.

Welding operations at Gar Wood Industries, Inc., Richmond, Calif. Inert-arc metal-arc welding was used. (K1, Al)

304-K. Aircomatic Welding for Fabricators. *Western Machinery and Steel World,* v. 43, Mar. 1952, p. 84-86, 110.

Applications of process to Al, stainless, Ni, Cu, and other hard-to-weld metals. (K1)

305-K. Sky-Beams; Spot Welds Reduce Weight. *Western Machinery and Steel World,* v. 43, Mar. 1952, p. 91-93.

Structural floor beams of remarkably high strength-weight characteristics are being fabricated with spot welding for use in the cargo-carrying floors of the Boeing C-97 Stratofreighter. Material is clad Al alloy. (K3, Al)

306-K. Joining and Assembly Techniques: Aircraft Bearing Retention and High Strength Fasteners. Thomas A. Piper. *Western Machinery and Steel World,* v. 43, Mar. 1952, p. 94-95.

Method developed at Northrop Aircraft. Roll swaging is used to form bearing retainers. (K13)

307-K. The Welding of Pressure Vessels. H. Harris. *West of Scotland Iron and Steel Institute Journal,* v. 58, 1950-51, p. 11-38; disc., p. 39-48.

Present stage of development in the manufacture of welded pressure vessels. The problems caused by the necessity of using heavy boiler plates. Inspection procedure. (K general, T26, ST)

308-K. Navy-Qualified Welders Produce Intricate Parts. H. J. Boll. *American Machinist,* v. 96, Mar. 31, 1952, p. 94-95.

Pictorial story of welding of special parts of Al, Mg, and carbon and alloy steel; inspection procedures. (K1, S13, Al, Mg, CN, AY)

309-K. Effect of Elongation on Weld Quality. R. G. Alison. *Canadian Metals,* v. 15, Apr. 1, 1952, p. 44-45.

Ability of the weld to elongate depends more on the surface condition of the weld than it does on the type of electrode used. (K1)

310-K. Hermetic Seals. R. O. McIntosh. *Electrical Manufacturing,* v. 49, Apr. 1952, p. 120-123, 328, 330, 332, 334.

Advantages and limitations of various methods for making sealed electrical connections to components that are protected from the atmosphere. Plastic and inorganic materials and the joining of insulator substances to metals. Design data. 12 ref. (K11)

311-K. Local Preheating by Induction in the Arc Welding of Steel Plate. L. N. Belov. *Engineers' Digest,* v. 13, Mar. 1952, p. 79-81. (Translated and condensed from *Avtogenno Delo,* Dec. 1951, p. 9-11.)

Conditions for proper operation including arc condition, flux density, inductor arrangement, and heating time. Simultaneous preheating and welding can be done. Diagrams and table. (K1, CN, AY)

312-K. Back to Work Because of Braze-Welding. *Linde Tips and Oxy-Acetylene Tips,* v. 31, Apr. 1952, p. 42-43.

Some repair jobs that put a useful and important piece of equipment back to work by braze-welding with an oxy-acetylene welding blowpipe. (K8)

313-K. Principles of Braze-Welding. *Linde Tips and Oxy-Acetylene Tips,* v. 31, Apr. 1952, p. 44.

Figures with descriptive captions. (K8)

314-K. How to Join Copper and Aluminum. Walter P. Hill *Refrigerating Engineering,* v. 60, Apr. 1952, p. 347-349, 412.

A series of tests and experiments conducted for a period of six years to develop a practical and foolproof production method for joining Cu and Al. (K general, Al, Cu)

315-K. A Survey of Modern Theory on Welding and Weldability. D. Seferian. *Sheet Metal Industries,* v. 29, Mar. 1952, p. 239-248, 254.

Arc welding electrodes. Functions of the electrode coating, electrical and physical action of the coating, slag analysis, types of slags, and refining of the metal. Micrographs. 18 ref. (To be continued.) (K1)

316-K. Seventy Years of Welding. Howard J. Thompson. *Transactions of the Institute of Welding,* v. 14, Dec. 1951, p. 195-200.

An illustrated review, with emphasis on welded heavy equipment. (K general)

317-K. All-Welded Plate Web Girder. D. H. McPherson. *Transactions of the Institute of Welding,* v. 14, Dec. 1951, p. 210.

Fabrication technique to avoid distortion with an unusually thin web. Diagrams. (K1, T26, ST)

318-K. Reports of International Commissions. *Transactions of the Institute of Welding,* v. 14, Dec. 1951, p. 211-215.

Reports of Commissions on electric arc welding, resistance welding, fatigue of welded structures, weldability, and brittle fractures. Presented at Oxford, England, July, 1951. (K general, Q23)

319-K. Welding Procedures for the Copper-Base Alloys. II. (Concluded.) Lester F. Spencer. *Welding Engineer,* v. 37, Apr. 1952, p. 42-46, 48.

Fusion welding of the various bronzes and of the alloys containing Ni. Resistance welding methods for Cu and all Cu-base alloys. Tables, photographs and 16 ref. (K general, K3, Cu)

320-K. "Contour" Arc Welding. F. J. Pilia. *Welding Engineer,* v. 37, Apr. 1952, p. 54.

New semi-automatic equipment permits welding contoured sheet-metal assemblies by a manual method affording advantages of mechanized welding. (K1)

321-K. Positioners Grow Bigger. *Welding Engineer,* v. 37, Apr. 1952, p. 56.

Positioners for weldments on a 70-ton hopper railroad car and a diesel A-frame. (K1, CN)

322-K. Synthetic Resin Glues: Preliminary Study of Factors Affecting the Strength of Glued Joints in Aluminium Alloys. "Adhesives", His Majesty's Stationery Office (London), 1951, p. 1-18. Based on report by W. J. Roff and K. W. Pepper.) (K12, Al)

323-K. (Book) **Adhesives.** 89 pages. 1950. His Majesty's Stationery Office, London W.C.2, England. (Selected Government Research Reports, v. 7.)

Includes factors affecting strength of glued joints in Al (synthetic resins). Pertinent individual papers are separately abstracted. (K12, Al)

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of the principle to other alloys, and the composition of appropriate coatings. (L23, Al)

337-L. A Study of Primers for Ferrous Metals in an Atmospheric Exposure. T. A. Dembski. *Official Digest,* Dec. 1951, p. 879-884; disc., p. 885.

Previously abstracted from *American Paint Journal,* (Convention Daily). See item 770-L, 1951. (L26, ST)

338-L. How One Company Handles Refinery Painting. W. B. Cook. *Petroleum Refiner,* v. 31, Mar. 1952, p. 128-133.

See abstract "Refinery Painting", *Corrosion* (Technical Section); item 298-L, 1952. (L26)

339-L. What Electroforming Offers the Designer of Precision Parts. A. G. Buschow. *Precision Metal Molding,* v. 10, Mar. 1952, p. 39-40, 65-66.

Metals used and typical applications. (L18)

340-L. Simple Aluminum Coloring Technique Is Suitable for Common Die Cast Alloys. *Precision Metal Molding,* v. 10, Mar. 1952, p. 53.

New process called "Alumox 44" permits the use of such colors as yellow, blue, green and brass on cast or wrought Al alloys. (L14, Al)

341-L. Black Anodizing of Aluminum Die Castings is a Production Operation. K. W. McCrea. *Precision Metal Molding,* v. 10, Mar. 1952, p. 51-53.

Processes used. (L19, Al)

342-L. Electroplating, Metallic and Clear Lacquers Utilized in Casket Finishing. Ezra A. Blount. *Products Finishing,* v. 16, Mar. 1952, p. 18-24, 26.

Operations employed by the Belmont Casket Mfg. Co., in the plating of steel and Zn-base die castings. Various finish effects are created with colored, clear, or translucent lacquers. (L17, L26, Zn, ST)

343-L. The Hot Spray Method of Finishing Passenger Car Bodies. J. B. Wiesel. *Products Finishing,* v. 16, Mar. 1952, p. 26, 28, 30, 32, 34, 36.

Development of suitable lacquers as automobile finishes. Advantages offered in the use of lacquers. Advantages of the hot-spray method of application. (L26)

344-L. Plating to Meet Today's Conditions. Myron B. Diggin. *Products Finishing,* v. 16, Mar. 1952, p. 38-40, 42, 44, 46, 48.

Various finishing methods and the alterations made due to current shortages of needed metals such as Ni, Cu, Sn, and Cd. (L17)

345-L. Spotlighting Finishing Progress. Allen G. Gray. *Products Finishing,* v. 16, Mar. 1952, p. 56, 58, 60, 62, 66, 68, 72, 74, 76, 78, 80, 82, 84.

Surveys recent studies on impurities in Ni-plating baths and on finishing Mg for assembly protection. (L17, L general, Ni, Mg)

346-L. Methods of De-Enamelling Vitreous-Enamelled Components. W. H. Billingham. *Sheet Metal Industries,* v. 29, Mar. 1952, p. 269-272.

De-enameling with caustic-soda solution, the molten caustic method, de-enameling by shot-blasting, and de-enameling by acid. (L12)

347-L. Modern Developments in Metallizing. Sam Tour. *Welding Journal,* v. 31, Mar. 1952, p. 199-206.

Modern developments in metal spraying and in sealing or impregnating the porous metal coatings to make them more resistant and impervious to corrosion. Mechanical properties and corrosion protection. (L23, Al, Cu, SS, Cn, Ni, Sn, Zn)

348-L. Some Remarks on the Subject of Zinc Replacement in Hot Galvanizing. (In French.) A. Gordet. *Métallurgie et la Construction méchanique,* v. 83, Jan. 1952, p. 53, 55-56.

Industrial tests, various working methods, bath compositions, etc. (L16, Zn)

349-L. Advantages of Chromium Plating in Combustion Engines. (In French.) G. Mohr. *Métallurgie et la Construction mécanique,* v. 84, Feb. 1952, p. 117, 119-120.

Experiments on various parts. (L17, Cr, ST)

350-L. A Cause of Warping of Sheets During Enameling. (In German.) A. Dietzel and E. Wegner. *Berichte der Deutschen Keramischen Gesellschaft e. V., und des Vereins Deutscher Emailfachleute e. V.,* v. 28, Nov. 1951, p. 642-649.

It is shown experimentally that sheet metals enameled on one side warp because of the sudden expansion upon passing the Ar_3 point. Good behavior of sheet containing Ti, and factors to be observed in spraying the sheet with a thin layer of base enamel. Photographs, graphs, and tables. (L27, ST)

351-L. Coating an Ingot-Steel Roll With Hard PVC. (In German.) Jakob Bernhard. *Kunststoffe,* v. 42, Feb. 1952, p. P13-F14.

Process used to provide corrosion resistance required for certain applications. (L24, CN)

352-L. Testing Methods for Nickel Electroplating Baths and Nickel Coatings. (In German.) J. Elze. *Metall,* v. 6, Jan. 1952, p. 5-11.

Various testing methods (on the basis of the literature) for adhesive strength, porosity, hardness, etc. The importance of internal stresses in the material to be plated, also other factors. Diagrams, micrographs, and 12 ref. (L17, Ni)

353-L. Lacquer Coating on Aluminum. Max Schenk. (In German.) *Metall,* v. 6, Mar. 1952, p. 136-138.

Various methods by which lacquers of different composition can be made to adhere to an Al surface, particularly by an anodic pretreatment developed by the author. Tests of this and photographs. (L19, L26, Al)

354-L. Improvement of Surface Quality of Ground Workpieces by Electrolytic Polishing and Its Relationships to Mechanical Properties. (In German.) J. Heyes. *Metalloberfläche,* ser. B, v. 3, Dec. 1951, p. B177-B179.

Reports of experiments on electropolishing of carbon and alloy steel crankshafts. Investigation shows that the process can also be applied successfully to larger workpieces. Results are tabulated, charted, and illustrated by micrographs. (L13, CN, AY)

355-L. Comparative Investigation of Polishing With a Phosphoric Acid-Sulfuric Acid and an Acetic Acid-Perchloric Acid. Electrolyte. (In German.) J. Heyes. *Metalloberfläche,* ser. B, v. 3, Dec. 1951, p. B179-B181.

Results of experiments on application of above solutions to electropolishing of a 0.35% C steel are tabulated and charted. (L13, CN)

356-L. Electrolytic Brass Coatings. (In German.) O. Kramer. *Metalloberfläche,* ser. B, v. 3, Dec. 1951, p. B181-B183.

Practical requirements for successful electrolytic brass plating, such as composition of the bath, temperature, current, voltage; as well as causes of various defects. (L17, Cu)

357-L. Grinding and Polishing Agents. (In German.) W. Burkart. *Metalloberfläche,* ser. A, v. 6, Jan. 1952, p. A1-A4.

Properties, hardness, chemical composition and specific uses. Photomicrographs show structures of some of the more commonly used agents. (L10)

358-L. Electrolytic Deposition of Tin Alloys. (In German.) Edmund R. Thews. *Metalloberfläche,* ser. B, v. 4, Jan. 1952, p. B5-B6.

Composition and conditions of electroplating Sn-Pb alloys. (L17, Sn, Pb)

359-L. Palladium Deposits. (In German.) R. Erdmann. *Metalloberfläche,* ser. B, v. 4, Jan. 1952, p. B6-B7.

Review of literature and patents includes discussion of composition and plating conditions. (L17, Pd)

360-L. Patina Production on Objects of Art. (In German.) K. Stark. *Metalloberfläche,* ser. B, v. 4, Jan. 1952, p. B7-B8.

Procedure for producing an antique patina on vases, dishes, busts, etc., made of silver, gold, copper, or brass. (L14, Ag, Au, Cu)

361-L. The Dip-Grinding Process. (In German.) G. Hermes. *Metalloberfläche,* ser. B, v. 4, Jan. 1952, p. B8-B10.

The high cost of hand polishing and the inadequacy of hydropolishing. Design and operation of a dip-grinding machine. (L10)

362-L. Difficulties Encountered During Barrel Galvanizing. (In German.) Otto Niedermeyer. *Metalloberfläche,* ser. B, v. 4, Jan. 1952, p. B10-B11; Feb. 1952, p. B24-B25.

Improved methods of degreasing, pickling, and galvanizing for greater resistance to corrosion. (L12, L16, CN, Zn)

363-L. Modern Electrolytic Degreasing. (In German.) A. Pollack. *Metalloberfläche,* ser. A, v. 6, Feb. 1952, p. A27-A28.

Most important properties of good electrolytic degreasing bath. (L13)

364-L. Welded Deposited Coatings on Streetcar Rails. (In German.) G. Krüger. *Schweissen und Schneiden,* v. 4, Feb. 1952, p. 50-55.

Technological and metallurgical means for increasing the crack and wear resistance of rails. Use of killed "M steel" and austenitic 18-8-6 electrodes for certain types of rails. Electrode development, thermal expansion, internal and superficial stresses, and types of current applied. Micrographs and schematic diagrams. (L24, Q9, CN)

365-L. New Technology of Electric-Arc Hard Surfacing Cutting Tools. (In Russian.) G. P. Ivanov. *Stanki i Instrument,* v. 22, May 1951, p. 20-22.

A machine for applying a hard coating to cutting tools was developed. Tests were made under various conditions. The equipment and test results. (L24, ST)

366-L. Does the Gamma Phase of Iron Exist in Vapor-Deposited Coatings? (In German.) Hans König. *Zeitschrift für Metallkunde,* v. 43, Jan. 1952, p. 26-28.

Reports on experiments. At room temperature, there is no evidence of a γ-phase of Fe in such layers. 10 ref. (L25, M26, Fe)

367-L. Liquid Abrasive Machining. (In Russian.) N. I. Goraetskii. *Stanki i Instrument,* v. 22, July 1951, p. 27-31.

Problems connected with the design and use of liquid abrasive machining. Experimental machine is diagrammed. Data charted. (L10)

368-L. Electrolytic Brass Plating From Non-Cyanide Solutions. (In Russian.) A. I. Stabrovskii. *Zhurnal Obshchei Khimii,* v. 21(83), July 1951, p. 1223-1229.

Experiments were made on the deposition of Cu-Zn alloys from a series of solutions (chlorides, thiosulfates, alkaline solutions with glycerine, etc.) which did not contain cyanides. Results are tabulated and charted. (L17, Cu, Zn)

369-L. Degreasing in the Plating Shop; Plant and Technique Which Make for Better Cleaning at Lower Cost With Reduced Trichlorethylene Consumption. W. F. Jesson. *Electroplating and Metal Finishing,* v. 5, Mar. 1952, p. 77-84. (L12)

370-L. Relationships Between Color, Type of Alkali Ions and Adherence of Ground Coats Containing Cobalt Oxide. H. C. Marshall and R. M. King. *Finish,* v. 9, Apr. 1952, p. 20-21, 54.

Refers to enameling of sheet iron. Data are charted and tabulated. (L27, ST)

371-L. Conservation in Enameling Operations. Evan Oliver. *Finish,* v. 9, Apr. 1952, p. 34-35, 38, 68-71.

Suggestions for conserving labor and materials and practical information on reworking of rejected parts. (L27, ST)

372-L. Hard Chrome Plate in Maintenance. Gilbert C. Close. *Finish,* v. 9, Apr. 1952, p. 25-28, 71-73.

See abstract of "Chromium Plating; New Life for Worn Parts", *Steel;* item 389-L, 1952. (L17, Cr, ST)

373-L. Painting Aluminum Awning. Sidney H. Glickman. *Industrial Finishing,* v. 28, Mar. 1952, p. 26-28.

Surface preparation and other processes used at KoolVent Metal Awning Co., Chicago. (L26, Al)

374-L. Hot Lacquer Painting of Army Convertibles. Walter Rudolph. *Industrial Finishing,* v. 28, Mar. 1952, p. 56-58, 60, 62.

Some features of the painting facilities at Twin Coach Co., Kent, Ohio. (L26, CN)

375-L. Flock Coating Auto Seat Springs. *Industrial Finishing,* v. 28, Mar. 1952, p. 66-68, 70.

Process at the L. A. Young Spring & Wire Corp. (L26, CN)

376-L. To Conserve Copper—New Method Tested for Cladding Bullet Jackets. Sam Tour. *Iron Age,* v. 169, Mar. 27, 1952, p. 108-110.

New method for cladding Cu to steel has been tested, but is not yet in commercial production. Molten Cu or gilding metal is poured onto a steel slab with the aid of a methyl borate flux. Welded-on side walls hold the metal on the steel slab until it solidifies. Then the composite is rolled out. Tests indicate an excellent bond between the two metals. (L24, Cu, ST)

377-L. Caustic Etch Treats Aluminum Without Sludge or Scale. R. J. Stell. *Iron Age,* v. 169, Apr. 3, 1952, p. 138-139.

Formation of sludge and scale in caustic treatment of Al has been virtually eliminated with a new caustic etching product. Dissolved Al remains in solution as sodium aluminate, rather than being deposited as alumina on tank walls and heating coils. Tanks are easily cleaned by hosing. More consistent finishes are reported. (L12, Al)

378-L. An Introduction to Clad Metals. Walter L. Keene. *Iron and Steel Engineer,* v. 29, Mar. 1952, p. 109-118; disc., p. 118-119.

Characteristics, and principles and methods of bonding. Extensive list of U. S. patents on composite and clad metals. Diagrams. (L24)

379-L. Low Cost Black Oxide Finish Produced on Steel by Chemical Dip Method. A. J. Mitchell. *Materials & Methods,* v. 35, Mar. 1952, p. 92-95.

Attractive, durable, and corrosion resistant finish suitable for a variety of applications, including machine parts, bearings, gages, aircraft engine components, and similar products. (L14, ST)

380-L. Diffusion as a Cause of Porosity. *Metal Industry,* v. 80, Mar. 14, 1952, p. 213.

Experiments using Cu, Al, Ni, Zn, and Sn in electroplating in an attempt to explain displacement of the interface and porosity in the diffusion zone. (L17, Ni, Cu, Al, Zn, Ni, Sn)

AMERICAN CHEMICAL PAINT COMPANY

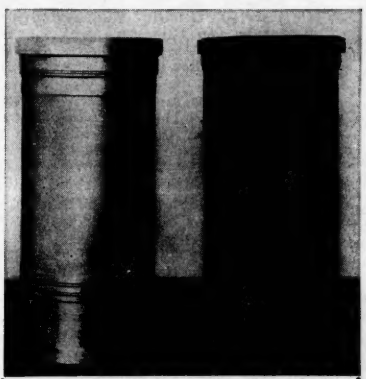
AMBLER CHEMICALS ACP PROCESSES PENNA.

Technical Service Data Sheet

Subject: PROTECTING FRICTION SURFACES WITH THERMOIL GRANODINE®

INTRODUCTION

Fabricators and product designers, particularly in the automotive field, are aware that even highly polished surfaces under friction weld, gall and score. One of the most inexpensive and practical methods of preventing this is to coat the metal to prevent metal-to-metal contact. With cast iron or steel, the "Thermoil-Granodine" manganese-iron phosphate coating provides a wear-resistant layer of unusual effectiveness.



Thermoil-Granodizing greatly prolongs the life of parts subject to friction. It protects the surface of products like the diesel engine liners shown above and the many moving parts of automobiles and other machines. "Thermoil-Granodine" with its remarkable lubricating properties is particularly valuable in these and similar applications because of its ability to retain oil and maintain lubrication under high pressures and high velocities. This ACP wear-proofing chemical not only permits rapid break-in without scoring, scuffing and welding but also reduces subsequent wear on friction parts.

"THERMOIL-GRANODINE" PROTECTS RUBBING PARTS

Thermoil-Granodizing removes "fuzz" from ferrous metal friction surfaces and produces a coating of non-metallic, water-insoluble manganese-iron phosphate crystals which soak up and hold oil as bare untreated metal cannot do. The oiled crystalline "Thermoil-Granodine" coating on piston rings, pistons, cylinders, cylinder liners, cranks, cam-shafts, gears, tappets, valves, spiders and other rubbing parts, allows safe break-in operation, eliminates metal-to-metal contact, maintains lubrication and reduces the danger of scuffing, scoring, welding, galling and tearing of the metal. The work to be protectively treated is merely Thermoil-Granodized and oiled, usually with a soluble oil.

"THERMOIL-GRANODINE" MEETS THESE SPECIFICATIONS

SPECIFICATION NUMBER	SPECIFICATION TITLE
MIL-C-16232 Type I	Coatings — phosphate; oiled, slushed, or waxed (for ferrous metal surfaces) and phosphate treating compounds.
AN-F-20 (See also U.S.A. 3-213)	Finishes, for electronic equipment.
U.S.A. 57-0-2C Type II, Class A	Finishes, protective, for iron and steel parts.
U.S.A. 51-70-1 Finish 22.02, Class A	Painting and finishing of fire control instruments; general specification for
M-364	Navy aeronautical process specification for compound phosphate rust-proofing process.

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381-L. White Brass Plating—One Solution to the Nickel Freeze. Webster B. Knight. *Metal Progress,* v. 61, Mar. 1952, p. 61-64.

Results of investigations made to determine practicable alternatives for Ni in automotive plating. Five methods—advantages and drawbacks, emphasizing the white-brass, Cr-flash method. Cu-Zn constitution diagram. (L17, Zn, Cu, Cr, Ni)

382-L. Perchloric Acid Hazard. E. Knuth-Winterfeldt. *Metal Progress,* v. 61, Mar. 1952, p. 80.

Precautionary measures for safety when using perchloric acid in electropolishing. (L13)

383-L. Polishing Tantalum. G. W. Wensch, K. B. Bruckart, and M. Conolly. *Metal Progress,* v. 61, Mar. 1952, p. 81.

Details of electropolishing technique and solution. (L13, Ta)

384-L. Factors Influencing Structure of Electrodeposits. *Metal Progress,* v. 61, Mar. 1952, p. 106. (Condensed from "The Structure of Electrodeposits", by J. J. Dale.)

Discusses and classifies structure of electrodeposits and the factors affecting their growth. (L17, M27)

385-L. Chromium Impregnation of Carbon Steel. *Metal Progress,* v. 61, Mar. 1952, p. 118, 122.

See abstract of "Mechanism and Kinetics of the Chromizing of Mild Steel in Atmospheres Containing Chromous Chloride", T. P. Hoar and E. A. G. Croom, *Journal of the Iron and Steel Institute;* item 11-L, 1952. (L15, CN)

386-L. Stains on Aluminum-Sprayed Steel Surfaces. *Metal Progress,* v. 61, Mar. 1952, p. 150, 154, 156.

See abstract of "The Protection of Steel by Sprayed Aluminum", by W. E. Ballard, *Electroplating and Metal Finishing;* item 85-L, 1952. (L23, Al, ST)

387-L. The Hydride Aluminum Plating Bath. *Modern Metals,* v. 8, Mar. 1952, p. 24.

New Al plating technique, employing a hydride plating bath. The new bath consists of an ethereal solution of Al chloride and a metal hydride. (L17, Al)

388-L. Mobile Drum Cleaning Plant. George Grupp. *Organic Finishing,* v. 13, Mar. 1952, p. 24-25.

Installation developed by U. S. Army Quartermaster Corps for cleaning and reconditioning cans and drums. Includes wire-brushing equipment. (L10, L12, ST)

389-L. Chromium Plating: New Life for Worn Parts. *Steel,* v. 130, Mar. 31, 1952, p. 76-77.

Procedures and applications for hard Cr plating of gages, worn bearing surfaces, and cutting tools when wear threatens to end their useful life. (L17, Cr, ST)

390-L. Possibilities in Porcelain Enameled—Coated Steels Conserve Scarce Alloys. Edward Mackasek. *Steel,* v. 130, Apr. 7, 1952, p. 116-117.

Porcelain-enamel researchers report coatings that have high resistance to temperature, corrosion, thermal shock, severe abrasion, and a low coefficient of friction. (L27)

391-L. Washer-Tumbler Speeds Cleaning, Deburring. *Steel,* v. 130, Apr. 7, 1952, p. 117.

Unit is a combined washer and tumbling barrel whose perforated steel drum in 40 in. in diam. (L10)

392-L. Electroforming Produces Intricate Shapes to Close Tolerances. Charles L. Faust and William H. Safranek. *Tool Engineer,* v. 28, Apr. 1952, p. 37-40.

The process, costs, properties, and applications of electroformed metals. (L18)

393-L. Metallic Coatings. W. W. Bradley. "Encyclopedia of Chemical Technology. Vol. 8" (Interscience Encyclopedia, New York), 1952, p. 898-922.

Reviews the various processes and principal materials involved. 35 ref. (L general)

394-L. Electropolishing and Chemical Polishing of Aluminum. (In German.) H. Hug. *Aluminium Suisse,* v. 2, Jan. 1952, p. 4-13.

The processes and their application in Switzerland and various patents pertaining to them. Colored photographs show decorative applications. Various bath compositions. (L13, L10, Al)

395-L. The Action of Pickling Inhibitors. (In Italian.) Antonio Indelli and Giampaolo Bolognesi. *Metallurgia Italiana,* v. 44, Feb. 1952, p. 73-77.

Gas-analysis data on the action of allyl isothiocyanate at 25 and 60° C. The action of this reagent as a function of acid concentration was determined. An evaluation was made of efficiency of the pickling inhibitor both with respect to economy in iron and acid and of corrosion resistance of the surfaces obtained. Tables and charts. 33 ref. (L12, Fe, ST)

396-L. The Problem of the Change of Acidity in the Cathode Region (Catholyte) During Electrodeposition of Metals. (In Russian.) S. I. Berezina and G. S. Vozdvizhenskii. *Zhurnal Prikladnoi Khimii,* v. 24, Aug. 1951, p. 832-839.

The pH values were measured by means of Pt-H_2 electrodes. Data on variations of pH with H+ ion concentration, current density, and different concentrations of various acids and salts are charted. (L17)

397-L. Electrode Potentials During Electrolysis of Salts of Various Metals With Mercury Electrodes. (In Russian.) P. P. Tsyb and M. T. Kozlovskii. *Zhurnal Prikladnoi Khimii,* v. 24, Aug. 1951, p. 840-850.

Determined experimentally for salts of Sn and Cd. Dependence of electrode potentials on metal concentration and acidity of the electrolyte was established for various conditions. Data are tabulated and charted. (L17, Sn, Cd)

398-L. Electrolysis of Zinc Salts. (In Russian.) M. T. Kozlovskii, P. P. Tsyb, and E. I. Ruzina. *Zhurnal Prikladnoi Khimii,* v. 24, Aug. 1951, p. 882-886.

The dependence of electrode potentials on the concentration of Zn in the amalgam and in the electrolyte for various conditions was determined. Data are tabulated and charted. (L17, Zn)

399-L. X-Ray Study of the Reactions of the Steel Surface When Titanium Enamel Is Applied Directly to Steel. Gordon S. Douglas and Jason M. Zander. *Better Enameling,* v. 23, Feb. 1952, p. 6-9, 22-23, 32-34.

See abstract from *Journal of the American Ceramic Society;* item 130-L, 1952. (L27, ST)

400-L. The Extension of the Life of a Nickel Bath by the Use of Barium Peroxide. Jason M. Zander and Otto C. Linhart. *Better Enameling,* v. 23, Mar. 1952, p. 6-7, 29-30.

Bath used to deposit a thin film of Ni on steel prior to vitreous enameling. (L27, Ni, ST)

401-L. Finishing Aluminum Castings. Evans Newcomb. *Canadian Metals,* v. 15, Apr. 1, 1952, p. 30-31.

Use of coated abrasive belts, sand and die-cast Al, inside polishing of aluminum ware, and mechanics of polishing Al. (L10, Al)

402-L. Filtering Is Key in Removal of Nickel Tank's Oxidized Sludge. *Ceramic Industry,* v. 58, Apr. 1952, p. 111.

How to go about saving Ni in the enamel plant with the oxidizing method of tank cleaning described in the previous issue. (L27, Ni)

403-L. Galvanic Behavior of Tin Dipped Coatings on Copper Alloys. F. L. LaQue. *Corosion* (News Section), v. 8, Apr. 1952, p. 1.

Shows that above coatings, as well as those of the Pb-Sn alloys, such as wiping solder (60% Pb, 40% Sn) may form corrosion-product films that may make them more noble without any effect due to the alloy layer near the interface between the coating and the base metal. Experimental graph. (L16, Sn, Pb, Cu)

404-L. Chlorinated Rubber Corrosion-Resistant Coatings. F. K. Shankweiler, G. N. Bruxelles, and R. E. Whitney. *Corrosion* (Technical Section), v. 8, Apr. 1952, p. 130-139; disc., p. 139.

Numerous case histories of commercial use in varied maintenance problems where chemical resistance is essential establish the economical merit of these coatings. Among the fields discussed are acid plants, paper mills, water works, industrial machinery, sewage-disposal plants, and concrete construction protected by chlorinated rubber. Test panels and equipment are illustrated; data are tabulated. (L26)

405-L. Chromium Plating Reduces Roll Maintenance. Charles H. Belvin. *Fibre Containers and Paperboard Mills,* v. 37, Mar. 1952, p. 65-66, 68-70.

Preventive maintenance, recovery maintenance, and continuity maintenance. Considers various types of rolls, screen plates, etc. (L17, Cr)

406-L. Stresses in Vitreous Enamel on Cast Iron. *Foundry Trade Journal,* v. 92, Mar. 6, 1952, p. 259.

See abstract of "Stresses on Enameled Cast Iron," by Alfred Thürmer, *Berichte der Deutschen Keramischen Gesellschaft e.V. und des Vereins Deutscher Emailfachleute e.V.;* item 105-L, 1952. (L27, CI)

407-L. Direct-Fired Kilns and New Drying Method Increase Production 200 Per Cent. Frank S. Lappin. *Industrial Gas,* v. 30, Mar 1952, p. 10-12.

Expansion and production at Abingdon Potteries, a subsidiary of Briggs Mfg. Co., Detroit, producer of porcelain-enameled formed steel and vitreous china "beautyware." (L27, CN)

408-L. Chemical and Anodic Treatments; a Patent Review. *Light Metals,* v. 15, Mar. 1952, p. 93.

Anodizing patents published by the British Patent Office since 1946; their potential or known usefulness. (To be continued.) (L19, Al)

409-L. New Life for Worn Surfaces. *Linde Tips and Oxy-Acetylene Tips,* v. 31, Apr. 1952, p. 38-39.

Resurfacing by welding. (L24)

410-L. The Chromium Plating of Light-Metal Cylinders. *Metal Progress,* v. 61, Apr. 1952, p. 120, 122, 124, 126. (Condensed from "Light Metal Chromed Cylinders".)

Previously abstracted from *Engineer,* see item 574-L, 1951. (L17, Al)

411-L. Mechanical Descaling Method for Wire. *Metal Progress,* v. 61, Apr. 1952, p. 158, 160. (Translated and condensed from "The Method and Results Obtained With a Machine for Descaling Wire", Walter Zwierz.)

Previously abstracted from *Stahl und Eisen.* See item 68-L, 1952. (L10, ST)

412-L. The How and Why of Protective Coatings. Raymond P. Hill. *Paper Trade Journal,* v. 134, Apr. 4, 1952, p. 22, 24, 26.

Use of organic coatings in corrosion protection. (L26)

413-L. Comparative Wear Characteristics of Some Electrodeposited Metals. R. F. Ledford and E. A. Dominik. *Plating,* v. 39, Apr. 1952, p. 360-365.

Work done primarily to determine the wear resistance of electrodeposits commonly applied to printing plates. The standard test specimen was a section of a printing plate prepared in a standard, uniform manner. Comparative wear characteristics of electrodeposits produced from like solutions of different composition and operating conditions. Effect of some commonly considered contaminants or addition agents. Three Cu-plating solutions, one Fe solution, one Cr solution, and 8 Ni solutions were used. (L17, Q9, Cu, Ni, Cr, Fe)

414-L. Tentative Recommended Practice for Preparation of and Plating on Aluminum Alloys. (Concluded.) *Plating*, v. 39, Apr. 1952, p. 366-368, 375-376.

Cu plating, Cr plating, Au plating, Ni plating, Ag plating, Sn plating, and Zn plating on Al; racking; rinsing. Appendix on cleaning and conditioning treatments. (L17, Al)

415-L. Conservation of Nickel in the Plating of Chemical Process Equipment. A. Kenneth Graham. *Plating*, v. 39, Apr. 1952, p. 369-370, 376.

Factors that influence the minimum coating thickness required in plating of steel. Data are tabulated. (L17, Ni, ST)

416-L. Tests On Some Special Base Paints for the Protection of Magnesium Alloys. "Paints", His Majesty's Stationery Office (London), 1949, p. 35-48. (Based on R.A.E. Report by H. G. Cole.)

Sea-water spray corrosion tests were made on painted chromate treated Mg alloys. Method of testing and results tabulated. (L26, R11, Mg)

417-L. The Effect of Heating on the Corrosion Resistance of Chromate Treated and Painted Magnesium Alloy Castings. "Paints", His Majesty's Stationery Office (London), 1949, p. 53-62. (Based on R.A.E. Report by H. G. Cole.)

After chromate treating and painting with air-drying paints, castings were heated to 160° C. for 1 hr. Slight decrease in resistance to seawater spray corrosion occurred. Data are tabulated. (L14, L26, R4, Mg)

418-L. Tests on Phenyl Mercury Acetate As a Fungicide in Paints for the Protection of Magnesium Alloys. "Paints", His Majesty's Stationery Office (London), 1949, p. 63-70. (Based on R.A.E. Report by H. G. Cole.)

Tests of addition of one part in 2000 of phenyl mercury acetate as a fungicide in black finishing coat paints with respect to retardation of mold growth and corrosion of Mg alloys by sea-water spray. Data are tabulated. (L26, R4, Mg)

419-L. (Book) **Analysis of Electroplating and Related Solutions.** Kenneth E. Langford. 387 pages. 1951. Electroplating and Metal Finishing, 83-85 Udney Park Rd., Teddington, Middlesex, England.

More than 300 methods for the determination of principal constituents and impurities. Sampling, control of cleaners, pickles, dips, etches, phosphating solutions, and electrobrightners; analysis of plating salts and of water; physicochemical methods of analysis; preparation of standard solutions for volumetric analysis; and numerous tables. (L17, S11)

420-L. (Book) **Galvanizing (Hot-Dip).** Ed. 3. Heinz Bablik. 502 pages. 1951. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. $10.00.

American edition; originally published in England. See item 144-L, 1951. (L16, ST, Zn)

421-L. (Book) **Paints.** 70 pages. 1949. His Majesty's Stationery Office, London W. C. 2, England. (Selected Government Research Reports, v. 2.)

Includes papers on effect of surface treatment of brass and yellow metals on the adhesion of paint films, tests on special base paints for protection of Mg alloys, and effect of heating on corrosion resistance of chromate treated and painted Mg alloy castings. Pertinent individual papers are separately abstracted. (L26, Mg)

M

METALLOGRAPHY, CONSTITUTION AND PRIMARY STRUCTURES

140-M. The Distribution of Electrons Round Impurities in Monovalent Metals. J. Friedel. *Philosophical Magazine*, ser. 7, v. 43, Feb. 1952, p. 153-189.

Results of theoretical investigation. Applications are made to dissolved H_2, where the impurity is a proton, and to atoms such as Zn, Ga, etc., which are usually considered to contribute their electrons to the conduction electrons. A detailed discussion is given of X-ray emission and absorption, the vacancy left in the X-ray shell being treated as the positive impurity. In certain cases quantitative predictions are made about the energies of X-ray absorption edges. 55 ref. (M25)

141-M. The Structure of the ζ Phase in the Silver-Zinc System. (In English.) I. G. Edmunds and M. M. Quraishi. *Acta Crystallographica*, v. 4, Sept. 1951, p. 417-425.

Structure for 50 at.% Ag was determined from X-ray powder photographs, using a modified form of the method of steepest descents. Results are comprehensively presented, using tables and graphs. (M26, Ag, Zn)

142-M. The Crystal Structure of the β-Phase of Uranium. (In English.) Charles W. Tucker, Jr. *Acta Crystallographica*, v. 4, Sept. 1951, p. 425-431.

Deduced from X-ray diffraction measurements made on single crystals of the phase retained in an alloy containing 1.4 at. % Cr and rapidly cooled from 720° C. The low symmetry and complexity of the structure accounts for the rather hard, brittle nature of the phase. Inter-relations between the α, β and γ phases of the metal are clear from the β-phase crystal structure, but the precise mechanism of the transformations has not yet been studied. 10 ref. (M26, U)

143-M. Diffraction of X-Rays by Structures in Disordered Layers. I. (In French.) G. W. Brindley and J. Mering. *Acta Crystallographica*, v. 4, Sept. 1951, p. 441-447.

While the approximations in the theoretical treatments of X-ray diffraction by two-dimensional gratings are in many cases valid and justify application of the resultant formulas (in particular the Laue-Warren formulas) to the interpretation of experimental data, in certain cases a more detailed treatment is required. Concerned with variation of the structure factor within the zone of integration involved in determining the reflected intensity from a random powder of two-dimensional gratings. Application of the formulas derived. 12 ref. (M22)

144-M. Diffraction Effects in X-Ray Fourier Syntheses Due to Non-Observed "Weak Reflexions". (In English.) Arne Magnéli. *Acta Crystallographica*, v. 4, Sept. 1951, p. 447-450.

A crystal structure in which displacements of certain atoms suddenly occur at long, regular intervals gives strong X-ray reflections only in the close vicinity of reciprocal-lattice points, corresponding to the period of the basic sublattice. If the remaining reflections, which may be very weak, are not detectable by the experimental method applied, then larger diffraction effects can appear in the Fourier calculations of the electron-density function based on the observed X-ray data. (M22)

145-M. Optical Methods in X-Ray Analysis. II. Fourier Transforms and Crystal-Structure Determination. (In English.) H. Lipson and C. A. Taylor. *Acta Crystallographica*, v. 4, Sept. 1951, p. 458-462.

The optical apparatus described in Part I can be used to determine experimentally the Fourier transforms of two-dimensional projections of atomic arrangements. Methods of using these transforms to determine crystal structures; and examples of their application to certain known structures. Ways of extending this process of direct crystal-structure determination. 16 ref. (M26)

146-M. The Structure of NiSi. (In English.) Karel Toman. *Acta Crystallographica*, v. 4, Sept. 1951, p. 462-464.

The structure was determined from Weissenberg and rotating-crystal photographs using CuKα radiation. Dimensions of the unit cell were determined by the powder method. (M26, Ni, Si)

147-M. Twinning and Slip in α-Uranium. (In English.) R. W. Cahn. *Acta Crystallographica*, v. 4, Sept. 1951, p. 470-471.

A study was made of the crystallographic elements of twinning and slip in the orthorhombic (low-temperature) form of uranium. The experiments were carried out with coarse-grained metal made by recrystallization after small extensions. A special precision back-reflection X-ray camera was used, by means of which it was possible to obtain Laue patterns from grains previously selected under a polarizing microscope. (M27, Q24, U)

148-M. Semi-Microradiography and Its Application to Aluminum Alloys. (In French.) Mladen Paic. *Revue de Métallurgie*, v. 49, Jan. 1952, p. 51-59.

Theoretical principles and the technique of "semi-microradiography", as well as possibilities of the study of light alloys with respect to distribution of the components in cast Al alloys. Includes sketches and "semi-microradiographs". 28 ref. (M23, Al)

149-M. Observations on Drastically Quenched Iron-Carbon Melts. (In German.) Günter Falkenhagen and Wilhelm Hofmann. *Archiv für das Eisenhüttenwesen*, v. 23, Jan.-Feb. 1952, p. 73-74.

Brief discussion of X-ray and metallographic studies is illustrated by an X-ray diagram, photomicrographs, and tabular data. 11 ref. (M21, M22, N8, Fe, ST)

150-M. The Electron Microscope in Metallurgy. (In German.) Hans Mahl. *Metall*, v. 6, Feb. 1952, p. 69-73.

Principal electron microscopic methods of studying the surfaces of metals. Electron micrographs and diagrams. 25 ref. (M21)

151-M. Investigation of Aluminum-Titanium Alloys With High Titanium Content. W. Gruhl. (In German.) *Metall*, v. 6, Mar. 1952, p. 134-135.

The microscopic and radiographic investigation of a number of Al-Ti alloys with a Ti content of 50-80%. Results concerning the γ phase and the α solid solution. Micrographs. (M27, Al, Ti)

152-M. On the Platinum-Zinc and Platinum-Cadmium Systems. (In German.) H. Nowotny, E. Bauer, A. Stempft, and H. Bittner. *Monatshefte für Chemie und verwandte Teile anderer Wissenschaften,* v. 83, Feb. 15, 1952, p. 221-236.

Metallographic, X-ray, magnetic, and thermo-analytical methods were used to establish the phases of above alloys. Zn and Cd were found to be very soluble in Pt. Data graphed and tabulated. (M24, Pd, Zn, Pt, Cd)

153-M. A Method for Investigation of Quaternary Systems, Illustrated by the Lead-Zinc-Cadmium-Tin System. (In German.) Erich Lindner. *Zeitschrift für Metallkunde,* v. 42, Dec. 1951, p. 377-387.

Representation of constitution of quaternary system by means of cuts which are parallel to two intersecting edges of a tetrahedron. Saturation limits of the separation occurring in the system while in the liquid state. Tables and graphs. (M24, Pb, Zn, Cd, Sn)

154-M. Crystal Structure of $PtPb_4$. (In German.) Ulrich Rösler and Konrad Schubert. *Zeitschrift für Metallkunde,* v. 42, Dec. 1951, p. 395-400.

On the basis of the literature and of new experiments. Data on powder patterns using Cu-Kα radiation are tabulated. Relationship of structure of $PtPb_4$ to that of other binary alloys of the $CuAl_2$ family. (M26, Pt, Pb)

155-M. An Investigation of Plasticity and Other Properties of Alloys in the Fe-Ni-Ta System. (In Russian.) K. A. Osipov. *Izvestiia Akademii Nauk SSSR,* Section of Technical Sciences, June 1951, p. 848-851.

Limits of the λ and γ solid solutions of the above system were determined by measuring electrical resistance, hardness, and a "bending" index. Data are discussed and charted. (M24, Q23, Fe, Ni, Ta)

156-M. An Experimental Investigation of the Structure of Atoms in Crystals. (In Russian.) S. T. Konobeevskii. *Uspekhi Fizicheskikh Nauk,* v. 44, May 1951, p. 21-32.

Data from X-ray studies were used to calculate the possibility of the existence of atoms as such in crystals. Aluminum and diamond crystals were investigated. Data are tabulated and charted. (M25, Al)

157-M. Electron Metallography. R. D. Heidenreich. *Bell Laboratories Record,* v. 30, Mar. 1952, p. 101-105.

Use of the electron microscope to study structures of metals. (M21)

158-M. The In—In_2S_3 System. M. F. Stubbs, J. A. Schufle, A. J. Thompson, and J. M. Duncan. *Journal of the American Chemical Society,* v. 74, Mar. 20, 1952, p. 1441-1443.

Phase diagram for the In-In_2S_3 system, obtained by thermal analysis, metallography, and X-ray studies. In_2S_3, (In_2S_4), (In_2S_5), and InS were found to exist, but not the previously reported In_2S. (M24, In)

159-M. The Constitution of the Copper-Rich Copper-Zinc-Germanium Alloys. P. Greenfield and G. V. Raynor. *Journal of the Institute of Metals,* v. 80, Mar. 1952, p. 375-384.

Results of an investigation. 20 ref. (M24, Cu, Zn, Ge)

160-M. Note on Sub-Crystal Structure in Cold-Rolled Aluminium. A. E. L. Tate and D. McLean. *Journal of the Institute of Metals,* v. 80, Mar. 1952, p. 390.

A subcrystal structure has been detected microscopically in cold rolled Al. The subcrystals are about 20 times larger linearly than those detected by X-rays. Micrographs. (M26, Q24, Al)

161-M. A New Complex Eta-Carbide. A. Taylor and K. Sachs. *Nature,* v. 169, Mar. 8, 1952, p. 411.

During a recent examination of a complex iron-free, Ni-base alloy containing Co, Cr, Mo, and W, a microconstituent, thought to be a carbide, was extracted by electrolysis. The Debye-Scherrer pattern of the extract was closely analogous to that of a sample of Fe_4W_2C, but its lattice parameter was very much lower. Chemical analysis revealed, in addition to Ni and C, the presence of appreciable amounts of Si, Cr, Co, W, Mo, and N_2. A structural formula was developed analogous to the complex high-speed steel n-carbide $Fe_3(W,Mo)_3C$ reported by Goldschmidt. (M26, TS, C-n)

162-M. Metallography. G. K. Manning. "Encyclopedia of Chemical Technology. Vol. 8" (Interscience Encyclopedia, New York), 1952, p. 923-934.

Illustrates and discusses typical metallographic structures. Various methods used in specimen preparation, and use of the microscope. (M general)

163-M. New Data on the Crystalline Structure of the β-Phase of the Na-Pb System. (In Russian.) E. S. Makarov and Z.V. Popova. *Izvestiia Akademii Nauk SSSR,* Section of Chemical Sciences, July-Aug. 1951, p. 377-387.

X-ray study of the Na-Pb system indicated that the β-phase exists within the range 26.5-35.1 at. % Na. It has a cubic structure of the Cu_3Au type. Data are tabulated and charted. (M26, M24, Na, Pb)

164-M. Study of Imperfections of Crystal Structure in Polycrystalline Materials: Low Carbon Alloy and Silicon Ferrite. J. J. Slade, Jr. and Sigmund Weissmann. *Journal of Applied Physics,* v. 23, Mar. 1952, p. 323-329.

The technique of the new X-ray double spectrometer method was applied to the study of angular misalignment of crystal structure in alloys. The specimens investigated include a low-carbon alloy annealed at 850° C. and three silicon ferrite samples annealed at 980, 1100, and 1200° C. The data show a significant dependence of crystal perfection on annealing temperature, and demonstrate clearly that angular misalignment of the coherently reflecting regions within the grains decreases with annealing temperature, provided this temperature is not excessive. Influence of cold rolling on the subsequent annealing process. A mechanism of grain bending during plastic deformation is suggested; relationship between magnetic properties, annealing temperature, and crystal perfection of silicon ferrite. (M26, J23, Q24, P16)

165-M. Lattice Parameters, Coefficients of Thermal Expansion, and Atomic Weights of Purest Silicon and Germanium. M. E. Straumanis and E. Z. Aka. *Journal of Applied Physics,* v. 23, Mar. 1952, p. 330-334.

Data are tabulated and discussed. 15 ref. (M26, P10, P11, Si, Ge)

166-M. Approximate Elastic Spectrum of β-Brass From X-Ray Scattering. H. Cole and B. E. Warren. *Journal of Applied Physics,* v. 23, Mar. 1952, p. 335-340.

The diffuse scattering of X-rays from a single crystal of β-brass was measured at room temperature using a Geiger-counter spectrometer and crystal monochromated CuKα radiation. Measurements were made throughout a large region in reciprocal space, with special attention to the *hko* plane. Results are in excellent qualitative agreement with the theory developed by Laval and James in which temperature vibrations are expressed in terms of elastic waves. 10 ref. (M23, M26, Cu)

167-M. Analysis of Certain Errors in the X-Ray Reflection Method for the Quantitative Determination of Preferred Orientations. Warren P. Chernock. *Journal of Applied Physics,* v. 23, Mar. 1952, p. 341-345.

The reflection method for quantitative determination of pole figures, proposed by Schulz, proved to be limited with respect to the range of tilting angles in which satisfactory results can be obtained. The previously unexplained decrease in the diffracted intensity with increasing tilting angle for specimens with random orientation distribution can be accounted for on the basis of an elementary analysis of defocusing effects. The importance of accurate specimen alignment, and a satisfactory alignment check procedure. (M23)

168-M. Physical Structure and Magnetic Anisotropy of Alnico 5. Parts I and II. R. D. Heidenreich and E. A. Nesbitt. *Journal of Applied Physics,* v. 23, Mar. 1952, p. 352-371.

Results of a combined electron-microscope and electron-diffraction study. The experimental work substantially confirmed the physical picture established by the Kittel, Nesbitt, and Shockley theory. A new face-centered cubic precipitate, transitory in nature, was found, which is essential in accounting for the alloy's permanent magnet properties. Numerous micrographs, diagrams, and graphs. 18 ref. (M26, P16, Fe, Co, Ni, Sg-n)

169-M. A New Superlattice in Co-Pt Alloys. A. H. Geisler and D. L. Martin. *Journal of Applied Physics,* v. 23, Mar. 1952, p. 375.

Structure of an alloy containing 30% Co was investigated. It was found by X-ray diffraction analysis that this alloy formed a superlattice of the type to be expected for Pt_3Co; it is face-centered cubic with Co atoms on the corner sites and Pt atoms on the face centers analogous to Cu_3Au. Heat treatment transformations resulting in formation of this phase. (N26, N10, Co, Pt)

170-M. Joint Discussion on the Papers—The Crystal Structure of Graphite in Cast Iron, by W. S. Owen and B. G. Street; The Carbide Phase in Iron-Carbon-Silicon Alloys, by W. S. Owen. *Journal of the Iron and Steel Institute,* v. 170, Mar. 1952, p. 237-243.

Papers published in Feb. 1951 issue; item 71-M, 1951. (M26, N8, CI)

171-M. Solubility of Carbon in 18 Percent Chromium 10 Percent Nickel Austenite. Samuel J. Rosenberg and Carolyn R. Irish. *Journal of Research of the National Bureau of Standards,* v. 48, Jan. 1952, p. 40-48.

A series of high-purity Fe-Cr-Ni (18-10 base) alloys, with C ranging from 0.007 to 0.30%, was melted and solidified in vacuum. The presence or absence of carbides in these alloys after various mechanical and thermal treatments was determined by metallographic examination. (M26, AY)

172-M. Use of Etch Figures for Micrographic Investigations of Commercially Pure Aluminum and Aluminum Alloys. Jean Herenguel. *Journal of Metals,* v. 4, Apr. 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 194, 1952, p. 385-386.

Method and typical results. (M23, Al)

173-M. Contribution to the Metal-Carbon-Boron Systems. Frank W. Glaser. *Journal of Metals,* v. 4, Apr. 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 194, 1952, p. 391-396.

Metal-carbon-boron powder mixtures were hot pressed and the resulting specimens studied by X-ray

diffraction. It was found that, regardless of the starting composition, a metal boride phase was always the major component in these samples. Two new phases of the system Ti-B were found: Ti_2B and TiB_3. The existence of a controversial face-centered cubic phase of formula TiB was confirmed. Electrical resistivities were measured for various boride phases. Tabular data. 19 ref. (M24, P15, C, B)

174-M. Lead-Uranium System. R. J. Teitel. *Journal of Metals*, v. 4, Apr. 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 397-400.

Investigated by X-ray, thermal, and microscopic analyses. Two pyrophoric intermetallic compounds were found; UPb_3 and UPb. Crystallographic structure of UPb_3. A phase diagram was drawn for the system showing two eutectic and one synthetic reaction. Photomicrographs and tables. (M24, Pb, U)

175-M. Interpretation of a New Structure for Silicon Carbide, "SiC VII". (In Russian.) E. B. Gasilova, M. S. Beletskii, and M. I. Sokhor. *Doklady Akademii Nauk SSSR*, new ser., v. 82, Jan. 1, 1952, p. 57-60.

X-ray studies were made on powdered SiC. Data are tabulated. The existence of a 7th crystalline modification of the compound is claimed. Lattice parameters are tabulated. (M26, Si, C-n)

176-M. One Case of the Observation of Electron Diffraction From Gaseous Molecules. (In Russian.) A. I. Andrievskii and I. V. Kutovyi. *Doklady Akademii Nauk SSSR*, new ser., v. 82, Jan. 11, 1952, p. 225-228.

Conditions for obtaining the data, and examples. Data are charted for Cu_2O, CdO, and Cd_2O, on the basis of which crystal-structure parameters for Cu and Cd are tabulated. (M26, Cd, Cu)

177-M. Interpretation of the Crystal Structure of "SiC VIII". (In Russian.) E. B. Gasilova and M. I. Sokhor. *Doklady Akademii Nauk SSSR*, new ser., v. 82, Jan. 11, 1952, p. 249-251.

An X-ray study was made of SiC. Data are tabulated. An 8th type of structure is claimed to exist. (M26, Si, C-n)

178-M. Crystal Structure of the Cu_2Cd Phase. (In Russian.) P. P. Kripiakevich, E. I. Gladyshevskii, and E. E. Cherkashin. *Doklady Akademii Nauk SSSR*, new ser., v. 82, Jan. 11, 1952, p. 253-256.

X-ray data. The structure is shown to be the same as that of Zn_2Mg. 12 ref. (M26, Cu, Cd)

179-M. (Book) Practical Electron Microscopy. V. E. Cosslett. 299 pages. 1951. Academic Press, 125 E. 23rd St., New York 10. N. Y. $5.50.

An introduction to the basic physical features and to the functioning and operation of the several parts of the electron microscope. 290 ref. (M21)

N

TRANSFORMATIONS AND RESULTING STRUCTURES

106-N. Modes of Decomposition of the Ferrous Oxide Phase. (In French.) Robert Collongues and Georges Chaudron. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 234, Feb. 11, 1952, p. 728-729.

Experiments on iron or steel. Results and photomicrographs. (N8, Fe, ST)

107-N. Theory and Observations on Helicoidal Growth on the (0001) Faces of Silicon Carbide. (In French.) S. Amelinckx. *Journal de Chimie Physique et de Physico-Chimie Biologique*, v. 48, Nov.-Dec. 1951, p. 475-484.

A new theory of crystal growth based on the presence of dislocations in the crystal lattice. According to this theory, growth fronts develop in the spiral. Theory and results of a microscopic and interferometric study of (0001) faces of silicon carbide. The difference of level between two successive growth fronts was measured by means of an interferometric technique. Micrographs, diagrams, and tables. 18 ref. (N12, Si, C-n)

108-P. Role of Thermal, Mechanical, and Surface Treatments in the Cathodic Charging of Iron With Hydrogen. (In French.) Jean Duflot. *Revue de Métallurgie*, v. 49, Jan. 1952, p. 35-50.

Permeability of Armco iron for H_2 at room temperature, solubility of H_2 in Fe, the Fe-H_2 equilibrium, and the behavior of Fe when its H_2 content is as large as possible. Apparatus is diagrammed. Results are tabulated, charted, and illustrated by micrographs. (P13, N1, Fe)

109-N. Influence of Different Factors on the Kinetics of the Structural Hardening of Aluminum-Copper and Aluminum-Zinc Solid Solutions. (In French.) A. Berghezan. *Revue de Métallurgie*, v. 49, Feb. 1952, p. 99-113.

Investigated with respect to rate of annealing, method of recrystallization prior to tempering, mechanical and thermal treatments after tempering, and the relation between variation of mechanical properties and microstructure. Charts and micrographs. 25 ref. (N5, J general, Q general, M27, Al)

110-N. Study of the Martensitic Transformation in Austenitic Cast Iron. (In French.) P. Laurent and M. Batisse. *Revue de Métallurgie*, v. 49, Feb. 1952, p. 129-139.

The austenite-martensite transformation was studied for three normally austenitic castings. The formation of martensite facilitates subsequent graphitization, and an austenite micrographically distinct from the original austenite is produced. Tables, charts, and micrographs. (N8, CI)

111-N. Influence of Mechanical and Thermal Treatments Prior to Critical Cold Working on Recrystallization of Iron. (In French.) Michel Mouflard and Paul Lacombe. *Revue de Métallurgie*, v. 49, Feb. 1952, p. 140-144.

Results of experiments are tabulated, charted, and illustrated by macrographs. (N5, Fe)

112-N. The Lamellar Growth of Crystals. II. The Growth Mechanism of Crystals Which Are Not Close to Phase Equilibrium. (In German.) Ludwig Graf. *Zeitschrift für Metallkunde*, v. 42, Dec. 1951, p. 401-409.

A review on the basis of the literature and further experiments. The mechanism of crystal growth. 32 ref. (N12)

113-N. Effect of Cold Working on the Age Hardening of Soft Stel. (In German.) Wolfgang Gruhl. *Archiv für das Eisenhüttenwesen*, v. 23, Jan.-Feb. 1952, p. 39-45; disc., p. 45-46.

Experiments show that the specific electrical resistance of cold worked and age hardened steels decreases with degree of cold working and that increasing the age hardening temperature retards this resistance drop. This phenomenon is explained by reduced solubility of C and N_2 in the solid solution and by the re-formation of cementite and iron-nitride nuclei. Data are graphed. 29 ref. (N7, CN)

114-N. The Nucleation of the Solid. J. H. Hollomon and D. Turnbull. *American Institute of Mining and Metallurgical Engineers*, "The Solidification of Metals and Alloys", 1951, p. 1-19; disc., p. 19-23.

Mechanism of nucleation. By studying rate of solidification of dispersed samples of mercury over a very narrow temperature range, rate of nucleation as a function of time and temperature in the absence of impurities was measured. The observed nucleation rate is in good quantitative agreement with that predicted from the theory of nucleation now demonstrated to be correct quantitatively for the liquid-solid transition. 27 ref. (N2)

115-N. The Growth of Metal Crystals. Robert F. Mehl. *American Institute of Mining and Metallurgical Engineers*, "The Solidification of Metals and Alloys", 1951, p. 24-49; disc., p. 49-51.

Elementary facts and ideas concerning the growth of crystals, especially of metals. Growth of nuclei to large crystals. Includes diagrams and micrographs and a selective bibliography. (N12)

116-N. The Solidification of Steel Ingots. B. R. Queneau. *American Institute of Mining and Metallurgical Engineers*, "The Solidification of Metals and Alloys", 1951, p. 52-68; disc., p. 68-73.

Comprehensive discussion of various factors is used to coordinate and illustrate the principles discussed in the other papers in this book. Macrographs, tables, diagrams, and graphs. 11 ref. (N12, D9, ST)

117-N. Cathodic Sputtering for Micro-Diffusion Studies. Thomas F. Fisher and C. E. Weber. *Journal of Applied Physics*, v. 23, Feb. 1952, p. 181-183.

A method for uniform removal of microlayers of metal from cylindrical specimens based on sputtering of the metal from the cathode of a glow-discharge tube. Technique is applicable to diffusion studies, with advantages over more common methods. Tables. (N1)

118-N. The Relationship of Alpha and Beta Silicon Carbide. Henry N. Baumann, Jr. *Journal of the Electrochemical Society*, v. 99, Mar. 1952, p. 109-114.

Silicon carbide was formed under various time-temperature conditions from mixtures of SiO_2 and C and of Si and C. The products were examined by X-ray diffraction, electron and optical microscopy, and chemical analysis. Photomicrographs and tabular data. (N6, Si, C-n)

119-N. The Effect of the Elements of the First Long Period on the $\alpha \rightleftarrows \beta$ Transformation in Titanium. A. D. McQuillan. *Journal of the Institute of Metals*, v. 80, Mar. 1952, p. 363-368.

The method in which the hydrogen pressure in equilibrium with an extremely dilute solution of H_2 in a Ti-rich alloy is measured as a function of temperature in order to follow the phase transformations occurring in the alloy, described in a previous paper (item 123-N, 1951) was used for a systematic investigation of the effects of V, Cr, Mn, Ni, and Co on the above transformation. The maximum amount of each addition element used was approximately 5 at.%. Graphs and micrographs. (N6, Ti)

120-N. Micrographic Aspects of the Diffusion of Zinc and Aluminium in Copper. H. Bückle and J. Blin. *Journal of the Institute of Metals*, v. 80, Mar. 1952. p. 385-389.

Various possible explanations of the phenomenon. The authors favor

the one which assumes the existence of two different mechanisms of diffusion of the atoms of the alloying element, proceeding concurrently. 20 ref. (N1, Zn, Al, Cu)

121-N. Transformation Diagrams and the Hardenability of Alloy Steels. W. Steven. *West of Scotland Iron and Steel Institute Journal,* v. 58, 1950-51, p. 221-249.

Features of the formation of pearlite, bainite and martensite pertinent to studies of hardenability. Mechanical properties of the different structures are compared; those of tempered martensite are independent of chemical composition only in a very restricted sense. The limited extent to which information relevant to continuous cooling can be derived from isothermal transformation diagrams, and the potential importance of experimentally determined continuous cooling diagrams. 25 ref.
(N8, J26, AY)

122-N. Allotropic Transformations of Strontium. (In French.) Emile Rinck. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences,* v. 234, Feb. 19, 1952, p. 845-847.

Existence of three allotropic modifications of Sr with transformation points at 235 and 540° C. was determined by thermal analysis, electrical resistivity, differential thermoelectric, and expansion measurements on a specimen of redistilled pure Sr. Includes graph.
(N6, Sr)

123-N. The Classical Picture of Recrystallisation After Work Hardening. D. I. Cameron. *Australasian Institute of Mining and Metallurgy, Proceedings,* new ser., Mar. 31-June 30, 1947, p. 15-30.

Necessity for careful examination of annealing conditions in the range 550-750° C. Examines the area between hot work and cold work and experimental methods suggested for determining the effects of residual work hardening from semihot work by a cold rolling-annealing process. The effect of prior partial anneals on inhibition of subsequent recrystallization. A series of micrographs shows the progress of recrystallization in a selected field. 12 ref.
(N5, J23, CN)

124-N. The Allotropic Transformation of Hafnium and a Tentative Equilibrium Diagram of the System Zirconium-Hafnium. J. D. Fast. *Journal of Applied Physics,* v. 23, Mar. 1952, p. 350-351.

Temperature of the transformation is at least 550° C. higher than the value recently reported by Duwez. A tentative equilibrium diagram of the system. (N6, M24, Hf, Zr)

125-N. Diffusion in Grain Boundaries. M. H. Dawson, M. R. Achter and R. Smoluchowski. *Journal of Applied Physics,* v. 23, Mar. 1952, p. 373-374.

Two Letters to the Editor. Dawson points out that the work of Achter and Smoluchowski on diffusion in grain boundaries may really be a study of grain boundary precipitation as a function of solute super saturation and orientation difference at grain boundaries. (N1)

126-N. Diffusion of Indium Into Gallium Near the Melting Point. R. E. Eckert and H. G. Drickamer. *Journal of Chemical Physics,* v. 20, Mar. 1952, p. 532.

Data are charted, tabulated, and discussed. (N1, In, Ga)

127-N. The Structure of Carbides in Alloy Steels. Part II. Carbide Formation in High-Speed Steels. H. J. Goldschmidt. *Journal of the Iron and Steel Institute,* v. 170, Mar. 1952, p. 189-204.

An X-ray investigation carried out on filings and electrolytic carbide extracts of high speed 18-4-1 type steels showed that, apart from the austenite-martensite transformation, a variety of changes in carbide structure can occur on hardening and tempering and with varying alloy content. 20 ref. (N8, TS)

128-N. Diffusion of Hydrogen in Iron and Iron Alloys at Elevated Temperatures. P. L. Chang, and W. D. G. Bennett. *Journal of the Iron and Steel Institute,* v. 170, Mar. 1952, p. 205-213.

Effects of Cr, Ni, and Mo on the rate of H_2 permeation in Fe. Cr has little effect on permeation in the γ range but greatly reduces the rate of permeation in the α range. Ni and Mo have little effect. The permeation equation was re-examined. Graphs and tabular data. 19 ref. (N1, Fe)

129-N. Joint Discussion on the Papers—Structural Transformations in the Tempering of High-Carbon Martensitic Steels, by K. H. Jack; Magnetic Analysis of Iron-Carbon Alloys: The Tempering of Martensite and Retained Austenite, by J. Crangle and W. Sucksmith. *Journal of the Iron and Steel Institute,* v. 170, Mar. 1952, p. 248-255.

Papers published respectively in June and Sept. 1951 issues; items 173-N, 1951 and 36-N, 1952.
(N8, P16, CN)

130-N. Isothermal Transformation Characteristics of an Iron-Chromium Alloy of Titanium. Charles W. Phillips and Donald N. Frey. *Journal of Metals,* v. 4, Apr. 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 194, 1952, p. 381-385.

A study of the behavior of commercial Ti-Fe-Cr alloy, Ti-150 during heat treatment. It exhibits a martensitic transformation on cooling, also two nucleation and growth reactions. The reactions were followed by metallographic, X-ray diffraction, and microhardness methods. Graphs and photomicrographs.
(N11, N2, Ti)

131-N. S-Curves for Chromium Stainless Steels. *Metal Progress,* v. 61, Apr. 1952, p. 96-B.
(N8, SS)

132-N. The Question of the Migration of Austenitic Grain Boundaries. (In Russian.) M. G. Lozinskii. *Doklady Akademii Nauk SSSR,* new ser., v., 82, Jan. 1, 1952, p. 53-56.

Grain boundaries were observed to widen with increased temperature and with an increase of holding time at a given temperature. Apparatus is illustrated. (N3, ST)

133-N. The Kinetics of Superstructural Transformations. (In Russian.) N. S. Akulov and Ia. I. Feldshtein. *Doklady Akademii Nauk SSSR,* new ser., v. 82, Jan. 11, 1952, p. 221-223.

Ordering and magnetic properties of binary alloys. Face-centered and body-centered structures are considered. Results are compared with experimental data for CoMn.
(N10, P16, Co, Mn)

134-N. (Book) **The Solidification of Metals and Alloys.** 73 pages. 1951. American Institute of Mining and Metallurgical Engineers, 29 West 39th St., New York, 18, N. Y. $3.00.

Preface by Cyril Stanley Smith, plus three papers and accompanying discussion presented at an AIME symposium, Feb. 12, 1950. Individual papers are separately abstracted.
(N12)

Be Sure to Go—
34th National Metal Exposition and Congress
Philadelphia, Oct. 20-24, 1952

P
PHYSICAL PROPERTIES AND TEST METHODS

168-P. Mercury; the Purest Metal. J. B. Lawrence. *Instruments,* v. 25, Mar. 1952, p. 310-312, 363.

When is mercury clean? How is mercury cleaned? Why does skin reform on "clean" mercury? Answers to these questions. (P10, Hg)

169-P. Type 416 Retains Magnetic Properties at 450° F. R. H. Esling. *Iron Age,* v. 169, Mar. 20, 1952, p. 106-108.

Type 416 stainless steel was investigated for use in a controller governing a high-temperature, high-pressure corrosive fluid system. It was found that this alloy's magnetic properties undergo no significant change. Amount of hysteresis is slightly decreased at 450° F. A specially designed, Fahy-type permeameter was used in tests. Data are tabulated and graphed. (P16, SS)

170-P. The Reduction of Nickel Oxide by Hydrogen. Giuseppe Parravano. *Journal of the American Chemical Society,* v. 74, Mar. 5, 1952, p. 1194-1198.

The reaction was studied in the range 150-350° C. and initial pressures of H_2 of 200-500 mm. Addition of foreign ions to NiO affects both rate and activation energy for reduction. These effects are related to the change in electronic properties of the oxide. 13 ref. (P13, P15, Ni)

171-P. The Solubility of Cadmium in Mixtures of Cadmium Chloride With Other Chlorides. Daniel Cubicciotti. *Journal of the American Chemical Society,* v. 74, Mar. 5, 1952, p. 1198-1200.

Solubility of Cd in mixtures of $CdCl_2$ with the chlorides of K, Ca, Ce, Mn, Mg, and Zn was determined at 740° C. Addition of any of these salts reduced the solubility. Effectiveness in reducing solubility is compared with anion-to-cation ratio of the salt and electropositiveness of the metal of the cation. (P13, Cd)

172-P. The Variation With Wavelength of the Spectral Emissivity of Iron and Molybdenum. Jack Eldon Taylor. *Journal of the Optical Society of America,* v. 42, Jan. 1952, p. 33-36.

Presents a study on the above. A gradual rise in the emissivity for both metals was observed as the blue end of the spectrum is approached. The increase in the emissivity of iron with decrease in wavelength is much greater than that observed for molybdenum. The emissivity of iron in the body-centered form at temperatures below 1178° K is observed to be higher at all wavelengths than it is for the higher-temperature face-centered cubic form. (P17, Fe, Mo)

173-P. Analysis of the Excitation Characteristics of Spectra Emitted by Ferrous Alloys. J. K. Hurwitz and J. Convey. *Journal of the Optical Society of America,* v. 42, Jan. 1952, p. 24-30.

The excitation potentials of the observed wavelengths of the spectral lines emitted in low-alloy steel spectra are calculated. The slopes of the working curves were found to be independent of alloying elements, matrix, and discharge conditions. Alterations in the circuit parameters and consequent changes in the discharge had little or no influence upon the intercept of the working curves. 19 ref. (P17, AY)

174-P. Competitive Adsorption From Solution Between Hydrophobic and Hydrophilic Molecules and Ions. R. L.

Merker and W. A. Zisman. *Journal of Physical Chemistry*, v. 56, Mar. 1952, p. 399-404.

Refers to Pt foil and effects of varying pH, dissociation constant, and concentration. Generalizes results to include other unreactive metals; and extends usefulness to corrosion inhibition, electrode phenomena, and aqueous lubricants. 15 ref. (P13, R10)

175-P. The Adsorption of Hydrophobic Monolayers of Carboxylic Acids. Hayward R. Baker, Elaine G. Shafrin, and William A. Zisman. *Journal of Physical Chemistry*, v. 56, Mar. 1952, p. 405-412.

The adsorption technique reported previously was successfully extended to the study of monolayers physically adsorbed onto Pt from aqueous solutions of a variety of mono-and dicarboxylic acids. A new "thermal-gradient method" for using a pure, molten compound was found by which adsorbed, close-packed monolayers can be prepared and isolated on metal in the absence of solvent. 18 ref. (P13, Pt)

176-P. Adiabatic Magnetization of Super-Conductors. K. Mendelssohn. *Nature*, v. 169, Mar. 1, 1952, p. 366.

With respect to methods for obtaining temperatures below 1° K., an equation is given which shows that using metals with high T_c and high θ, such as Ta and Cb, one can, when starting at about 1° K., reach temperatures well below 0.1° K. While the cooling efficiency is lower than in the paramagnetic method, the necessary fields are also smaller and therefore permit a larger volume to be cooled. Best application of the method would, however, not be as a rival but as a supplement to the paramagnetic one. (P16, Ta, Cb)

177-P. The Natural Radioactivity of Rubidium. S. C. Curran, D. Dixon, and H. W. Wilson. *Philosophical Magazine*, ser. 7, v. 43, Jan. 1952, p. 82-92.

Results of investigations. 26 ref. (P13, Rb)

178-P. Metallic Conduction—the Internal Size Effect. An Addendum. D. K. C. MacDonald. *Philosophical Magazine*, ser. 7, v. 43, Jan. 1952, p. 124-125.

The Hall effect in metals at low temperatures, especially those exhibiting the anomalous minimum of electrical resistance. (P15)

179-P. Vibration Frequencies in Diatomic Molecules and in Solid Metals. E. C. Baughan. *Transactions of the Faraday Society*, v. 48, Feb. 1952, p. 121-128.

An empirical generalization is pointed out between the Debye frequencies of metallic solids and diatomic molecular vibration frequencies predicted by a formula due to Guggenheimer. Some implications for the theory of metallic valency. Data are tabulated. 18 ref. (P10)

180-P. Thermal Expansion Coefficients of α-Monoclinic Selenium. (In English.) Clarence J. Newton and Malcolm Y. Colby. *Acta Crystallographica*, v. 4, Sept. 1951, p. 477.

Results of determination by X-ray diffraction methods. (P11, Se)

181-P. New Highly Coercive, High-Permeability, High-Loss Ferromagnetic Materials. (In French.) Charles Guillaud. *Journal des Recherches du Centre National de la Recherche Scientifique*, Dec. 1951, p. 69-87.

A general review. Experiments with magnets produced by casting and by powder metallurgy; with Fe-Si, Fe-Ni, Fe-Mn, and Fe-Co-Ni alloys; and with ferrites. Applications. Tables, diagrams, and graphs. 45 ref. (P16, SG-n, p, Fe, Ni, Co, Mn)

182-P. Radiofrequency Measurement of Surface Layers on Metals. (In French.) R. G. Chambers. *Revue de Métallurgie*, v. 49, Jan. 1952, p. 65-66.

Results of some measurements dealing with the resistivity of surface layers of metals at high frequency and low temperature. (P15)

183-P. Highly Conductive Alloys. (In French.) W. W. Kee. *Revue de Métallurgie*, v. 49, Feb. 1952, p. 89-98.

Discusses two groups of Cu alloys—those which can be heat treated and those which cannot, with respect to their electrical conductivity, mechanical properties, and microstructure.
(P15, Q general, M27, Cu)

184-P. Progress in Knowledge Concerning the Metallic State: "Exo-Electrons". (In French.) J. Bergier and F. LeLionnais. *Revue Générale des Sciences pures et appliquées*, v. 58, Nov. 11, 1951, p. 341-349.

A general review of a new type of electron emission which occurs when an allotropic transformation releasing energy takes place in a metal. Various techniques and results of experiments. (P15, N6)

185-P. New Method Which Permits Measurement of Hall Effect in Series and in Parallel. (In French.) A. L. Perrier. *Helvetica Physica Acta*, v. 24, Dec. 31, 1951, p. 637-641.

The method and its advantages over the traditional method. (P15)

186-P. Remarks on Fröhlich's Theory of Super Conductivity. (In German.) M. R. Schafroth. *Helvetica Physica Acta*, v. 24, Dec. 31, 1951, p. 645-662.

Theoretical, mathematical analysis. 11 ref. (P15)

187-P. Influence of Cobalt on the Properties of Cementite. (In French.) A. Michel and J. Drain. *Revue de Métallurgie*, v. 49, Feb. 1952, p. 114-116.

Influence on the Curie point of Fe_3C, and the thermomagnetic transformations of Cobalt cementites. Includes charts. (P16, Co, Fe)

188-P. Changing the Electrical Resistance of Pure Metals at the Melting Point. (In German.) Horst Gerstenkorn. *Annalen der Physik*, ser. 6, v. 10, Jan. 1, 1952, p. 49-79.

If the metal is in the molten state, X-ray structure investigations must replace the mathematical method of establishing probable electron dispersion and thus its electrical resistance. The method described permits determination of absolute specific resistance of solid and molten metals and the accurate liquid-solid resistance ratio at the melting point. Application to Li, Na, and K. 16 ref. (P15)

189-P. Development of Processes for Testing Ferromagnetic Materials. (In German.) Werner Jellinghaus. *Archiv für das Eisenhüttenwesen*, v. 22, Nov.-Dec. 1951, p. 401-410.

Reviews the literature. Permeability measurements of magnetically soft materials, measurement of the magnetic properties of permanent magnetic materials, and of magnetostriction. 54 ref. (P16, SG-n, p)

190-P. The Solubility of Oxygen in Iron Melts Under Ferrous Oxide, Silica, and Lime-Saturated Ferrous Oxide Slags at Temperatures of 1530-1700° C. (In German.) Wilhelm Anton Fischer and Hans vom Ende. *Archiv für das Eisenhüttenwesen*, v. 23, Jan.-Feb. 1952, p. 21-33; disc., p. 33.

Methods of chemical, metallographic, and X-ray analyses applied to this problem. Melting chemically pure iron oxide and lime in a soft-iron crucible at 1400-1450° C. yielded an isotherm in the CaO-FeO-Fe_2O_3 system which showed that, with increasing lime contents, the iron oxide content of the molten slag increases in equilibrium with iron, forming a lime ferrite. Graphs, tables, photomicrographs, X-ray diagrams, and numerous references.
(P12, Fe, ST)

191-P. Differences in Behavior of Ferromagnetic Substances in Small Magnetic Fields and in the Nonmagnetic State. (In German.) Hermann Fahlenbrach. *Archiv für das Eisenhüttenwesen*, v. 23, Jan.-Feb. 1952, p. 47-51.

Experimental examples show that the externally nonmagnetic behavior of a ferromagnetic substance depends on the method of demagnetization. An attempt is made to explain the differences in behavior after demagnetization by shock, and suitable annealing. Data are charted. 13 ref. (P16, SG-n, p)

192-P. Research on Suitable Compositions of Permanent-Magnet Steels Containing About 4% Cr, 2% Co, and 0.5% W (Co 040). (In German.) Walter Knorr. *Archiv für das Eisenhüttenwesen*, v. 23, Jan.-Feb. 1952, p. 53-55; disc., p. 55.

On the basis of 41 melts, effects of C, Cr, Co, W, and Co+W on magnetic properties of above steels were investigated. Co and W were found to have the greatest effect. Recommended composition. Data are graphed and tabulated.
(P16, SG-n, AY)

193-P. Solution of Iron by Dilute Sulfuric Acid in a Magnetic Field. F. Blaha. *Monatshefte für Chemie und verwandte Teile anderer Wissenschaften*, v. 83, Feb. 15, 1952, p. 248-250.

Tabulated data confirm Ehrenhaft's discovery that a magnetic field increases the evolution of oxygen due to solution of Fe in dilute H_2SO_4. (P13, Fe)

194-P. Density and Specific Volume of Liquid and Solid Gold-Silver Alloys. (In German.) Erich Gebhardt and Stefan Dorner. *Zeitschrift für Metallkunde*, v. 42, Dec. 1951, p. 353-358.

Experiments using an indirect float method and an NaCl melt. Density and specific volume of pure Au, pure Ag, and the 10-90, 20-80, 40-60, 60-40, and 80-20 Au-Ag alloys, were determined between the liquidus temperature and 1300° C. Thermal expansion coefficient, as well as density and specific volume of the same compositions, between 20° C. and the solidus temperature. Shrinkage during solidification and while cooling in the solid state. Data are tabulated and charted. 27 ref. (P10, P11, Au, Ag)

195-P. Increase in the Rate of Viscous Flow of Metals in the Electrolyte During Electrochemical Polarization. (In German.) August Pfützenreuter and Georg Masing. *Zeitschrift für Metallkunde*, v. 42, Dec. 1951, p. 361-370.

Results of measurement for Pb, Zn, Ag, Au, and Pt in the air and in an electrolyte. Possible explanation of the observed behavior. Data are tabulated and charted; apparatus is diagrammed. 11 ref.
(P15, Pb, Zn, Ag, Au, Pt)

196-P. Active Components of Ultrasonic Generation by Means of Ferromagnetic Powders. (In German.) Hans Heinrich Rust and Peter Pilz. *Zeitschrift für angewandte Physik*, v. 3, Oct. 1951, p. 379-382.

Ferromagnetic powders containing silicon seem to show a particularly large effect, and can thus be used for continuous ultrasonic generation. Results are tabulated and charted. (P10, SG-n, p)

197-P. Several Observations on the Formation of Potentials of Aluminum in Common Salt Solutions. (In German.) Richard Ergang, Georg Masing, and Margret Mohling. *Zeitschrift für Elektrochemie Berichte der Bunsengesellschaft für Physikalische Chemie*, v. 56, Jan. 1952, p. 8-16.

Reviews literature on the potentials of Al with different surface

conditions in NaCl solutions. Concentration of Cl ions was found to have no effect on the equilibrium potential. Data are graphed and tabulated. 16 ref. (P15, Al)

198-P. The Problem of Minimum Resistance of Magnesium at Low Temperatures. (In Russian.) L. S. Kan and B. G. Lazarev. *Doklady Akademii Nauk SSSR*, new ser., v. 81, Dec. 21, 1951, p. 1027-1029.

The resistance of Mg of high purity (99.99%) was measured at low temperatures (down to 1.325° K.). The method of preparation and testing. Data are charted. (P15, Mg)

199-P. Impulse Method for Determining Heat Capacity. (In Russian.) V. I. Khotkevich and N. N. Bagrov. *Doklady Akademii Nauk SSSR*, new ser., v. 81, Dec. 21, 1951, p. 1055-1057.

Method developed for measuring the heat capacity of metals in wire form. The apparatus and typical curves. (P12)

200-P. The Problem of Measuring Losses in Steels. (In Russian.) M. A. Rozenblat. *Doklady Akademii Nauk SSSR*, new ser., v. 81, Dec. 21, 1951, p. 1059-1062.

A system for measuring and calculating electrical losses in steel cores subjected to alternating current is described in theoretical and mathematical terms. (P15, ST)

201-P. Influence of Oxygen Adsorbed on Platinum on the Variation of Contact Potential. (In Russian.) T. V. Kalish and R. Kh. Burshtein. *Doklady Akademii Nauk SSSR*, new ser., v. 81, Dec. 21, 1951, p. 1093-1096.

Investigated over the range 20-800° C. Data are charted. (P15, Pt)

202-P. Values of Effective Ionic Radii of Elements in the Molten and Solid States at High Temperatures. (In Russian.) S. I. Sobol. *Zhurnal Prikladnoi Khimii*, v. 24, July 1951, p. 710-719.

The necessity of correcting values of atomic radii determined at room temperature for describing conditions at high temperatures. Data for various metals and alloys are tabulated and charted. 11 ref. (P15)

203-P. The Surface Energies of Metals and Alloys. C. J. Leadbeater. "Powder Metallurgy", His Majesty's Stationery Office (London), 1951, p. 1-21.

Relationships between surface energy and melting point, binding energy, atomic volume, compressibility and density divided by atomic weight were determined for large number of nonferrous metals. Influence of surface energy on surface lattice parameter and on viscous flow during sintering. 32 ref. (P10, H11)

204-P. The Adsorption of Gases on Metal Filaments, Films, and Single Crystals. Albert D. Crowell. *American Journal of Physics*, v. 20, Feb. 1952, p. 89-98.

Concepts involved in the study of adsorption of gases on solids. Particular stress is placed on the problem of uniform surfaces. A historical study is specifically concerned with metal filaments and evaporated films, and surfaces of metal single crystals, both considered as approximations to ideal surfaces for adsorption measurements. (P13)

205-P. Hall Effect and Ponderomotive Force in Simple Metals. Norman Rostoker. *American Journal of Physics*, v. 20, Feb. 1952, p. 100-107.

The Bloch-Sommerfeld theory of conductivity was applied to the calculation of momentum lost by conduction electrons because of collisions with the crystal lattice. The calculations provide the basis for a microscopic interpretation of the ponderomotive force. (P15)

206-P. Determination of Thermal Conductivity of Copper and Deoxidized Copper-Iron Alloys; Apparatus and Technique. M. J. Goglia, G. A. Hawkins, and J. E. Deverall. *Analytical Chemistry*, v. 24, Mar. 1952, p. 493-496.

A small laboratory apparatus for use in measuring thermal conductivity of Cu specimens containing small amounts of Fe. Apparatus is also suitable for studies in connection with other metals. Data for temperatures of 150, 300, and 500° F. Tables, charts, and apparatus diagram. (P11, Cu)

207-P. Some Measurements of the Total Emissivity of Metals and Pure Refractory Oxides and the Variation of Emissivity With Temperature. A. H. Sully, E. A. Brandes, and R. B. Waterhouse. *British Journal of Applied Physics*, v. 3, Mar. 1952, p. 97-101.

A method for rapid determination of the total emissivity of metals and oxides in the range 300-800° C. Values were obtained for lampblack and polished Pt and also for Nimonic 75, pure Ni, and stainless steel, having various surface conditions. The total emissivities of the pure oxides ceria, zirconia, thoria, magnesia, alumina, and fused silica were also determined. Effect of particle size of the oxides and of variation of emissivity with angle of emissions was studied. 10 ref. (P17, Ni, SS, Pt)

208-P. The Effect of Orientation and Shape on the Settling Velocity of Non-Isometric Particles in a Viscous Medium. John F. Heiss and James Coull. *Chemical Engineering Progress* (Engineering Section), v. 48, Mar. 1952, p. 133-140.

Al and Cr alloy steel spheres were used in determining the viscosity of the fluids by the falling-sphere method. Data on the physical properties of these spheres are tabulated. 28 ref. (P general, T8, Al, AY, Cu)

209-P. Vapor Pressures of Inorganic Substances. VIII. Molybdenum Between 2151 and 2462° K. James W. Edwards, Herrick L. Johnston, and Paul E. Blackburn. *Journal of the American Chemical Society*, v. 74, Mar. 20, 1952, p. 1539-1540.

Includes values calculated for heat of sublimation at absolute zero and equations formulated for vapor pressure as a function of temperature. 12 ref. (P12, Mo)

210-P. The Thermal Conductivity of Metals at High Temperature. C. L. Hogan and R. B. Sawyer. *Journal of Applied Physics*, v. 23, Feb. 1952, p. 177-180.

A modification of the Forbes bar method in the range 25-1000° C. A mathematical analysis is presented. Electrical and thermal conductivities of commercial "A" nickel, Inconel, several stainless steels, and 1010 steel. (P11, P15, Ni, SS, CN)

211-P. Considerations Regarding the Distribution of Radiation Damage in Matter Bombarded by Light Ions and a Method of Making It Uniform. Philip Schwed and Gerhart Groetzinger. *Journal of Applied Physics*, v. 23, Feb. 1952, p. 234-236.

A quantitative estimate of the spatial distribution of the radiation damage produced by mono-energetic ions. A simple method whereby uniform radiation damage can be produced in a relatively thick sample by the use of ions whose range equals the thickness of the sample. Discusses, specifically, 20-Mev. deuterons impinging on Cu. (P13, Cu)

212-P. Secondary Electron Emission From Metals Under Positive Ion Bombardment in High Extractive Fields. E. W. Webster, R. J. Van de Graafe, and J. G. Trump. *Journal of Applied Physics*, v. 23, Feb. 1952, p. 264-266.

As part of a study of breakdown mechanisms in high vacuum, experiments with hydrogen ions show that emission is small and increases only slowly with the electric field strength at the bombarded surface. Results are plotted for steel wires and both H_1+ and H_2+ ions. (P15)

213-P. The Measurement of Ultrasonic Attenuation in Solids by the Pulse Technique and Some Results in Steel. R. L. Roderick and Rohn Truell. *Journal of Applied Physics*, v. 23, Feb. 1952, p. 267-279.

Pulse techniques were extended and refined to obtain dependable measurements over the range of 5-50 megacycles. Understanding of relative importance of beam spreading, geometrical boundaries, and method of coupling was improved. Coupling by means of water buffer and direct mounting. Attenuation measurements were made on Cr-Mo steel. Data are tabulated and graphed; photomicrographs. 18 ref. (P10, AY)

214-P. A Modified Dew-Point Method for Vapour-Pressure Measurements of Lead-Mercury Alloys. B. R. Burgan, R. C. Hall, and R. F. Hehemann. *Journal of the Institute of Metals*, v. 80, Mar. 1952, p. 413-414.

The vapor pressure of mercury over several Pb-Hg alloys covering a wide range of composition was determined for a range of temperatures. The activities of Hg and of Pb were calculated for 324° C., and found to agree well with the results of Hildebrand, Foster, and Beebe. (P12, Hg, Pb)

215-P. The Infrared Properties of Gold Smoke Deposits. Louis Harris and John K. Beasley. *Journal of the Optical Society of America*, v. 42, Feb. 1952, p. 134-140.

New experimental results. Interpretation is based on application of classical electromagnetic theory. The gold smoke deposits are assumed to interact with infrared radiation as if they were sheets of an essentially uniform material which is characterized by an average electrical conductivity small compared to that of ordinary metals. The electrical conductivity of gold black deposits was found to be about 10^5 times that of bulk gold, and the volume percent of gold in a gold black deposit was found to be about 0.2%. (P17, Au)

216-P. The Specific Heats of Germanium and Grey Tin at Low Temperatures. R. W. Hill and D. H. Parkinson. *Philosophical Magazine*, ser. 7, v. 43, Mar. 1952, p. 309-316.

Specific heats were measured from liquid helium temperatures to 170 and 110° K. respectively. Shows that previous data on Ge are not valid for pure material, and that temperature variations of the Debye characteristic temperatures of these elements are very large. Enthalpy, entropy, and free-energy values are tabulated. 13 ref. (P12, Ge, Sn)

217-P. A Calculation of the Cohesive Energies and Pressure-Volume Relations of the Divalent Metals. S. Raimes. *Philosophical Magazine*, ser. 7, v. 43, Mar. 1952, p. 327-337.

A method for calculating the energy of the lowest state of a divalent metal, which renders unnecessary explicit calculation of an ion-core field. An expression for total energy of valence electrons is obtained, and applied to calculation of atomic radii, compressibilities, and cohesive energies. Calculated change of volume for up to 100,000 kg. per sq. cm. agree with the experimental data of Bridgman. Data for Mg, Ca, Sr, Ba, Zn, Cd, and Be are charted and tabulated. (P12)

218-P. The L Absorption Spectrum of Nickel. An Anomaly. Y. Cauchois. *Philosophical Magazine,* ser. 7, v. 43, Mar. 1952, p. 375.

Briefly discusses fact that the L_{III} absorption edge does not coincide with emission edge. (P17, Ni)

219-P. Intrinsic Magnetization in Alloys. W. J. Carr, Jr. *Physical Review,* ser. 2, v. 85, Feb. 15, 1952, p. 590-594.

The intrinsic magnetization of alloys among the iron transition group of metals is explained using a Heitler-London model for the 3d electrons. The magnetic moment associated with each atom is determined by the principle of maximum spin and the sign of the interaction between neighboring parts from the overlap of the wave functions. It is found that a large number of alloys derive their spontaneous magnetization from an antiparallel arrangement of atomic spins. (P16, SG-n)

220-P. The Scattering of 0.5-Mev. Circularly Polarized Photons in Magnetized Iron. Forrest P. Clay and Frank L. Hereford. *Physical Review,* ser. 2, v. 85, Feb. 15, 1952, p. 675-676.

Forward-direction Compton electrons from two magnetized Fe foils were detected by two thin stilbene crystals covered by Al foil. Scintillations were recorded by a fast coincidence circuit, and rates were measured for each of the four possible configurations of the magnetic fields. Data from 12 independent runs and the difference in coincidence rates for the indicated field configurations. (P16, Fe)

221-P. Properties of Thermally Produced Acceptors in Germanium. C. S. Fuller, H. C. Theuerer, and W. van Roosbroeck. *Physical Review,* ser. 2, v. 85, Feb. 15, 1952, p. 678-679.

Experimental data on the p-n transformation of Ge. Graphs show variation of acceptor concentration with temperature and calculated and observed values of resistivity. (P15, M26, Ge)

222-P. The Drift Mobility of Electrons in Silicon. J. R. Haynes and W. C. Westphal. *Physical Review,* ser. 2, v. 85, Feb. 15, 1952, p. 680-681.

Mobility of electrons injected into p-type Si was determined by measuring transit times between emitter and collector points with single-crystal rods. A schematic diagram of the circuit used successfully with Si is shown. (P15, Si)

223-P. On the Theory of Electrical Conductivities of Monovalent Metals. A. B. Bhatia. *Proceedings of the Physical Society,* v. 65, sec. A, Mar. 1, 1952, p. 188-191.

A theoretical and mathematical treatment. (P15)

224-P. Density of States Curve for the 3d Electrons in Nickel. G. C. Fletcher. *Proceedings of the Physical Society,* v. 65, sec. A, Mar. 1, 1952, p. 192-202.

A calculation was made of the energy density of electronic states for Ni, using the approximation of tight binding. Theoretical basis of the approximation is outlined and validity of the underlying assumptions examined. Required overlap integrals are evaluated and the secular equation for energy as a function of wave vector is solved exactly over the energy range of interest for Ni. The density-of-states curve is computed graphically. (P10, Ni)

225-P. A Note on the Structure of Selenium. E. Billig. *Proceedings of the Physical Society,* v. 65, sec. B, Mar. 1, 1952, p. 216-221.

Reviews recent work, mainly on single crystals, with a view to clarifying the electrical conductivity of Se. (P15, Se)

226-P. Electronic Structures and Physical Properties in the Alloy Systems Nickel-Copper and Palladium-Silver. B. R. Coles. *Proceedings of the Physical Society,* v. 65, sec. B, Mar. 1, 1952, p. 221-229.

A comparison is made of the magnetic, electrical, and thermo-electric properties of alloys in the two systems. Lattice spacings, optical properties, electronic specific heat, and X-ray spectroscopy of the Ni-Cu alloys. (P general, Ni, Cu, Pd, Ag)

227-P. Anomalous Thermal Conductivity of Pure Metals at Low Temperatures. J. K. Hulm. *Proceedings of the Physical Society,* v. 65, sec. A, Mar. 1, 1952, p. 227-228.

Analyzes recent work on the thermal and electrical conductivities of Na at low temperatures by Berman and Macdonald. Two types of discrepancy appear between their experimental data and the behavior predicted by the electron theory of metals. The discrepancy for Na at the lowest temperatures is essentially of the same type as that already well known for ten other metals, and originates in the fact that the observed coefficient of the T^2 term in the electronic thermal resistivity is nearly an order of magnitude lower than the theoretical value. Placing of special emphasis on Lorenz number for Na tends to obscure the fact that it is in the thermal resistivity rather than in the electrical resistivity that the main discrepancy occurs. 10 ref. (P11, Na)

228-P. Torque Curves and Other Properties of Permanent Magnet Alloys. K. Hoselitz and M. McCaig. *Proceedings of the Physical Society,* v. 65, sec. B, Mar. 1, 1952, p. 229-235.

Further investigations of Alcomax III and related alloys were made using a torque magnetometer. Torque curves were obtained after various sequences of heat treatment designed to throw light on the changes that occur in these alloys, and the magnitude and direction of the magnetic field applied during cooling was varied. A method of deriving three independent constants of crystal anisotropy without using single crystals was devised. (P16, Fe, Co, Ni, SG-n)

229-P. Magnetic Properties. P. W. Selwood. "Encyclopedia of Chemical Technology. Vol. 8" (Interscience Encyclopedia, New York), 1952, p. 617-624.

Theory of as well as magnetic behavior of the principal types of magnetic materials. 10 ref. (P16, SG-n, p)

230-P. Magnetic Substances. R. A. Chegwidden. "Encyclopedia of Chemical Technology. Vol. 8" (Interscience Encyclopedia, New York), 1952, p. 639-659.

Ferromagnetic materials and their properties. Tables and graphs show magnetic properties of various metallic and nonmetallic magnetic materials. 21 ref. (P16, SG-n, p)

231-P. Study of Electrolytic Phenomena With the Aid of Weak Alternating and Variable Frequency Currents. (In French.) Israel Epelboin. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences,* v. 234, Feb. 25, 1952, p. 950-952.

Variation of impedance of an electrolytic cell as a function of frequency was used to study electrode phenomena. In particular, there was noted a resonance related to the appearance of a diffusion layer around electrodes which are susceptible to selective dissolution. Characteristics of Ni and Pt electrodes in an acetic-perchloric acid bath were studied. Data are charted. (P15, L17, Ni, Pt)

232-P. Experimental Confirmation of Electrochemical Theory of Liquid Alloys in the Iron-Carbon-Silicon System. (In Russian.) O. A. Esin and L. K. Gavrilov. *Izvestiia Akademii Nauk SSSR,* Section of Technical Sciences, Aug. 1951, p. 1234-1242.

The emf.s developed between pairs of molten alloys of the above system were determined. The data are tabulated and charted for alloys containing 0.65-43.0 Si and 0.20-4.48% C. (P15, Fe, Si)

233-P. Phenomena Associated With the Flight of Ultra-Speed Pellets. Part III. General Features of Luminosity. John S. Rinehart, William A. Allen, and W. C. White. *Journal of Applied Physics,* v. 23, Mar. 1952, p. 297-299.

Ultra-speed pellets of the lighter metals such as Al and Mg generate intensely luminous trails when fired through air. A pronounced characteristic of the luminous trails is the intermittent manner in which the light is emitted. Brightness, luminous output, and temperature of the trail generated by an Al pellet were measured. Includes photographs of pellets in flight. (P17, Al)

234-P. Domain Structure of Perminvar Having a Rectangular Hysteresis Loop. H. J. Williams and Matilda Goertz. *Journal of Applied Physics,* v. 23, Mar. 1952, p. 316-323.

Investigation for a Perminvar containing 43% Ni, 34% Fe, and 23% Co. Effect of superposing an applied alternating field was also investigated, and an effective permeability of 4,000,000 was obtained. 14 ref. (P16, Ni, Fe, Co, SG-n)

235-P. Correlation of D.C. and Microsecond Pulsed Emission From Oxide Coated Cathodes. Frank A. Horak. *Journal of Applied Physics,* v. 23, Mar. 1952, p. 346-349.

A study of emission from oxide-coated cathodes prepared on four different base metals. One of the base metals was pure electrolytic Ni and the other three had impurities of 0.2% Si, and 4.7% W added to the Ni. The flat base-metal cathode was coated with equal molar Ba-Sr carbonate. The tubes were placed on life test at a cathode temperature of 1125° K. with no emission current drawn. D.C. and pulsed emission measurements were taken periodically. Three methods were used to measure the zero-field emission current. Results show that the different cathode base metals control the variation in emission with life. 13 ref. (P15, Ni)

236-P. The Mechanism of the Cathodic Hydrogen Evolution Reaction. J. O'M. Bockris and E. C. Potter. *Journal of the Electrochemical Society,* v. 99, Apr. 1952, p. 169-186.

Some of the outstanding problems of concept and mechanism in the field of cathodic-hydrogen evolution kinetics. A full derivation and correlation of kinetic equations, assuming no mechanism, reveals expressions for several parameters which take values specific to one or more mechanisms. Includes discussion of specific mechanisms for Hg, Ag, Ni, and Pt cathodes. 27 ref. (P13, Hg, Ag, Ni, Pt)

237-P. Joint Discussion on the Papers—Metallography of Carbon in Silicon-Iron Alloys Containing 4% Silicon, by E. D. Harry; The Variation in Electrical Properties of Silicon-Iron Transformer Sheet, by S. Rushton and D. R. G. Davies. *Journal of the Iron and Steel Institute,* v. 170, Mar. 1952, p. 232-237.

Papers published in Mar. 1951 issue; item 145-P, 1951. (P15, Fe)

238-P. Magnetic Behavior of Intermediate Phases in Alloys of Transition Elements. P. A. Beck. *Journal of Met-*

als, v. 4, Apr. 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 194, 1952, p. 420.

Sigma-phase specimens of the following compositions were tested: 40-40-20 Fe-Cr-Mo; 35-35-30 Fe-Cr-Mo; 48.7-50.2-1.1 Fe-Cr-W; and 40.7-59.3 Co-Cr (all atomic percentages). All were paramagnetic at room temperature; but only the first alloy became ferromagnetic at liquid-N_2 temperatures. (P16, Fe, Cr, Mo, Co)

239-P. The Formation of a Boundary Between Normal-Conducting and Superconducting Metal. M. P. Garfunkel and B. Serin. *Physical Review,* ser. 2, v. 85, Mar. 1, 1952, p. 834-840.

It was found that there is a large difference between the magnetic field at which the superconducting-normal state transition occurs and the magnetic field at which the normal state-superconducting transition occurs. These results are in agreement with the thermodynamic theory of phase transition. Shows how hysteresis determines the ratio of this surface energy to a characteristic dimension of the superconductor. A measure of this ratio is given between 3.37 and 3.68° K. for superconducting tin. 17 ref. (P15, Sn)

240-P. The Origin of High Permeability in Permalloy. Soshin Chikazumi. *Physical Review,* ser. 2, v. 85, Mar. 1, 1952, p. 918-919.

Alloys of the composition near Ni_3Fe have unusual magnetic properties sensitive to heat treatment. These properties were investigated in connection with formation of a superlattice at 490° C., and explained in terms of "directional order". Micrographs show domain patterns. (P16, Ni, Fe)

241-P. Resistivity of Evaporated Tellurium Films. Takemaro Sakurai and Seiji Munesue. *Physical Review,* ser. 2, v. 85, Mar. 1, 1952, p. 921.

A Te film was made on a substrate of a silica plate by vacuum evaporation, and its resistivity measured at various temperatures. The thickness of film was varied from 200 to 5000 A. Results are charted. (P15, Te)

242-P. The Stopping Power of a Metal for Charged Particles. David Pines. *Physical Review,* ser. 2, v. 85, Mar. 1, 1952, p. 931.

Theoretical, mathematical analysis. (P15)

243-P. Conductivity of Cold-Worked Metals. D. L. Dexter. *Physical Review,* ser. 2, v. 85, Mar. 1, 1952, p. 936-937.

In a recent paper, Landauer computed the change in conductivity using as a scattering potential the energy of the bottom of the conduction band, calculated from free-electron theory, in a lattice containing a single edge-type dislocation. This note extends and modifies these results. Effect of singularity in the assumed scattering potential. (P15)

244-P. Experiments With Audiofrequencies on Superconductors. B. Serin and C. A. Reynolds. *Physical Review,* ser. 2, v. 85, Mar. 1, 1952, p. 938-939.

Discusses in greater detail certain points in a recent paper under the above title, in response to an earlier paper of Galkin and Bezuglyi which criticized their conclusions. Work was done on superconducting tin. (P15, Sn)

245-P. Properties of Thin Layers of Superconductive Metals. (In Russian.) N. V. Zavaritskii. *Doklady Akademii Nauk SSSR.* new ser., v. 82, Jan. 11, 1952, p. 229-231.

Properties of layers of Sn and Tl less than 15 atoms thick were investigated between 2 and 50° K. Data are charted. (P15, Sn, Tl)

246-P. (Book) **Industrial Heat Transfer.** F. W. Hutchinson. 326 pages. Industrial Press, 148 Lafayette St., New York 13, N. Y. $6.00.

Presents and discusses equations finding the widest industrial applications, analyzes their applicability, and provides graphs which permit direct visual solutions of the most commonly encountered problems. (P11, J general)

247-P. (Book) **Thermodynamics of Alloys.** Carl Wagner. 161 pages. 1952. Addison-Wesley Press, Inc., Cambridge 42, Mass. $6.50. (Translated and revised by Svante Mellgren and J. H. Westbrook from *Handbuch der Metallphysik,* v. 1, Pt. 2, (Akademische Verlagsgesellschaft Becker and Erler Kom.-Ges., Leipzig, 1940).

In addition to the discussion of new methods and the data abstracted from papers published between 1940 and 1951, contains new sections on ternary and higher-order systems, empirical formulas, and relations between thermodynamic functions and the electronic constitution of alloys. Emphasis is on principles, but many data for specific systems illustrate the application of general relations. Alloy index and bibliography of 419 entries. Includes the thermodynamics of metallic phases involving such nonmetallic elements as hydrogen, carbon, nitrogen, sulfur, or phosphorus. (P12, M24, N general)

Q

MECHANICAL PROPERTIES AND TEST METHODS; DEFORMATION

305-Q. Notch Sensitivity At High Temperatures Evaluated. W. F. Brown, Jr. and George Sachs. *Iron Age,* v. 169, Mar. 20, 1952, p. 91-95.

See abstract of "A Critical Review of Notch Sensitivity in Stress-Rupture Tests," National Advisory Committee for Aeronautics, Technical Note 2433; item 555-Q, 1951. (Q23, AY, SG-h)

306-Q. The Experimental Approach to Aircraft Structural Research; the Fifteenth Wright Brothers Lecture. P. B. Walker. *Journal of the Aeronautical Sciences,* v. 19, Mar. 1952, p. 145-160; disc., p. 161-172.

Recent work done in Great Britain and particularly at the Royal Aircraft Establishment. Testing of small specimens made of Xylonite. Strength testing of actual aircraft opens up several fields of research activity. Design studies of new testing equipment for large aircraft and for pressurized cabins. Measurement of external forces in flight and the design of measuring instruments. Structural fatigue. (Q25, Q7)

307-Q. Strength of Alloy Cast Irons. H. A. Altorfer. *Machine Design,* v. 24, Mar. 1952, p. 162-164. (A condensation.)

An analysis of the limitations of cast steel and cast iron based on experimental results for cylindrical vessels. (Q23, CI)

308-Q. Inelastic Strains in Steel Beams. H. T. Corten, M. E. Clark, and O. M. Sidebottom. *Machine Design,* v. 24, Mar. 1952, p. 228, 230, 232. (A condensation.)

Experimental results. (Q23, ST)

309-Q. The Theory of Plastic Flow in Single Crystals. Frederick Seitz. "A Symposium on the Plastic Deformation of Crystalline Solids." *Office of Technical Services, U. S. Department of Commerce,* 1950, p. 1-36.

An extensive review. 54 ref. (Q24)

310-Q. Multiplication Processes for Slow-Moving Dislocations. F. C. Frank and W. T. Read, Jr. "A Symposium on the Plastic Deformation of Crystalline Solids," *Office of Technical Services, U. S. Department of Commerce,* 1950, p. 44-46; disc., p. 46-48.

Describes, using diagrams, how the process can take place. (Q24)

311-Q. Creep of Zinc Crystals. E. P. T. Tyndall. "A Symposium on the Plastic Deformation of Crystalline Solids," *Office of Technical Services, U. S. Department of Commerce,* 1950, p. 49-58; disc., p. 58-59.

A simple, empirical law of creep is proposed for Zn-crystals with a secondary orientation equal to or nearly equal to zero. No indication is found of any sudden onset of slip or of a critical shear stress for its occurrence. Diagrams and graphs. 12 ref. (Q3, Zn)

312-Q. The Yield Point in Single Crystal and Polycrystalline Metals. A. H. Cottrell. "A Symposium on the Plastic Deformation of Crystalline Solids," *Office of Technical Services, U. S. Department of Commerce,* 1950, p. 60-73; disc., p. 73-76.

Characteristics of the yield phenomenon. 33 ref. (Q23)

313-Q. The Lamellar Nature of Slip and Its Implications. T. H. Blewitt and J. S. Koehler. "A Symposium on the Plastic Deformation of Crystalline Solids," *Office of Technical Services, U. S. Department of Commerce,* 1950, p. 77-86; disc., p. 86-88.

Some experiments on Al, $AuCu_3$, and α-brass single crystals. The various stages of deformation. 15 ref. (Q24, Al, Cu)

314-Q. The Origin of Dislocations. F. G. Frank. "A Symposium on the Plastic Deformation of Crystalline Solids," *Office of Technical Services, U. S. Department of Commerce,* 1950, p. 89-99; disc., p. 100-102.

Outlines the deformation process. Formation of dislocations under stress, the dynamic multiplication of dislocations, and the origin of initial dislocations. 15 ref. (Q24)

315-Q. The Experimental and Theoretical Results of Plasticity at Normal Speeds of Strain. U. Dehlinger. "A Symposium on the Plastic Deformation of Crystalline Solids," *Office of Technical Services, U. S. Department of Commerce,* 1950, p. 103-110; disc., p. 110-112.

Briefly reviews work done in the past 20 years at Stuttgart University, Germany. Some semi-empirical formulas describing the data obtained. 14 ref. (Q24, Q23)

316-Q. X-Ray Diffraction Studies of Cold Work in Metals. B. E. Warren and B. L. Averbach. "A Symposium on the Plastic Deformation of Crystalline Solids," *Office of Technical Services, U. S. Department of Commerce,* 1950, p. 113-121; disc., p. 122-123.

Results of measurements on filings of α-brass. Data are graphed. (Q24, M22)

317-Q. Dislocation Models of Crystal Grain Boundaries. W. T. Read and W. Shockley. "A Symposium on the Plastic Deformation of Crystalline Solids." *Office of Technical Services, U. S. Department of Commerce,* 1950, p. 124-149.

Grain-boundary models for certain specially simple cases. How the results may be extended so as to apply more generally. (Q24)

318-Q. The Resultant Content of Dislocations in an Arbitrary Intercrystalline Boundary. F. C. Frank. "A Symposium on the Plastic Deformation of Crystalline Solids." *Office of Technical Services, U. S. Department of Commerce,* 1950, p. 150-151; disc., p. 151-154.

Shows that the dependence of the

dislocation density in the grain boundary depends upon the geometry of the situation. (Q24)

319-Q. A Study of Amplitude-Dependent Internal Friction Arising From the Motion of Dislocations in Single Crystals of Copper. A. S. Nowick. "A Symposium on the Plastic Deformation of Crystalline Solids." *Office of Technical Services, U. S. Department of Commerce,* 1950, p. 155-167; p. 167-170.

A quantitative study of the above as a function of frequency and temperature. Such measurements lead to information about the nature of the motion of dislocations at low stress levels. Data are graphed. 11 ref. (Q22, Q24, Cu)

320-Q. Decrement and Young's Modulus Measurements on Single Crystals of Copper and Lead. J. Marx and J. S. Koehler. "A Symposium on the Plastic Deformation of Crystalline Solids." *Office of Technical Services, U. S. Department of Commerce,* 1950, p. 171-183; disc., p. 183-184.

Attempts to discover the physical causes for the various effects resulting from the investigation. Data are graphed. 10 ref. (Q21, Cu, Pb)

321-Q. Structure of Cold-Worked Metals as Deduced From Anelastic Measurements. T. S. Ke and C. Zener. "A Symposium on the Plastic Deformation of Crystalline Solids." *Office of Technical Services, U. S. Department of Commerce,* 1950, p. 185-191; p. 191-192.

Results of an investigation. Data are graphed for cold worked Al. (Q24, Q21, M26, Al)

322-Q. The Plasticity of Polycrystalline Solids. Bruce Chalmers. "A Symposium on the Plastic Deformation of Crystalline Solids." *Office of Technical Services, U. S. Department of Commerce,* 1950, p. 193-196; disc., p. 196-198.

It has been believed by many investigators that the best approach to the understanding of plasticity was to study first the behavior of single crystals, and then to use this information to elucidate the more complex case of a polycrystalline aggregate. Progress that has been made from this point of view and the difficulties that arise when an attempt is made to interpret polycrystalline plasticity in terms of single-crystal data. 12 ref. (Q23)

323-Q. Wanted: Experimental Support for Theories of Plastic Flow. J. C. Fischer and J. H. Hollomon. "A Symposium on the Plastic Deformation of Crystalline Solids." *Office of Technical Services, U. S. Department of Commerce,* 1950, p. 199-208; disc., p. 209-210.

Surveys various theories of the time-dependent deformation of metals. Creep curves for several metals. (Q24, Q3)

324-Q. A Theory of Deformation Textures in Face-Centered Cubic Metals. Walter R. Hibbard, Jr. "A Symposium on the Plastic Deformation of Crystalline Solids." *Office of Technical Services, U. S. Department of Commerce,* 1950, p. 211-215.

Includes numerous diagrams. 15 ref. (Q24)

325-Q. The Crystallographic Aspect of Slip in Body-Centered Cubic Single Crystals. A. Opinsky and R. Smoluchowski. "A Symposium on the Plastic Deformation of Crystalline Solids." *Office of Technical Services, U. S. Department of Commerce,* 1950, p. 216-223.

Results of a general analysis of the slip behavior of body-centered cubic lattices and also results of some preliminary experiments on Fe-Si alloys. Graphs. (Q24, Fe)

326-Q. The Prediction of Uranium Deformation Textures. E. A. Calnan and C. J. B. Clews. *Philosophical Magazine,* ser. 7, v. 43, Jan. 1952, p. 93-104.

Tension, compression and rolling textures were derived for the orthorhombic metal α-uranium. From a consideration of the relative importance of the slip and twinning mechanisms, it is possible to differentiate between the textures developed after slight and severe deformations at both room and elevated temperatures. (Q24, U)

327-Q. A Calculation of the Elastic Shear Constants of β-Brass. H. Jones. *Philosophical Magazine,* ser. 7, v. 43, Jan. 1952, p. 105-112.

The stability of β-brass, with respect to shears across the (110) plane in the direction [110], is considered and is shown to be due mainly to the change of the Fermi energy as a result of shearing of the Brillouin zone. The constitution of the elastic shear constants, as the sum of three terms, is examined and a satisfactory account of the observed values is obtained. Difficulty experienced in attempting to retain the β-phases by quenching. (Q21, Q2, Cu)

328-Q. Quantitative Measurement of Preferred Orientation in Rolled Uranium Bars. G. B. Harris. *Philosophical Magazine,* ser. 7, v. 43, Jan. 1952, p. 113-123.

The preferred orientation of uranium bars hot-rolled and cold-rolled in the α range was determined quantitatively by X-ray diffraction using a Geiger counter. Hot rolling with a slight reduction causes the (010) planes to become strongly and the (110) planes weakly oriented perpendicular to the rolling direction. Further hot rolling causes the (110) planes to become strongly and the (130) planes weakly oriented in the planes perpendicular to the rolling direction. (Q24, U)

329-Q. The Non-Hookean Interaction of a Dislocation With a Lattice Inhomogeneity. M. A. Jaswon and A. J. E. Foreman. *Philosophical Magazine,* ser. 7, v. 43, Feb. 1952, p. 201-220.

The equilibrium position of an edge dislocation near certain types of lattice irregularities was investigated quantitatively, using the Peierls model of a dislocation. The external shear stress required to maintain equilibrium was calculated and the result extended to an array of like dislocations piled up against a barrier. The integral equation for the atomic displacements is linearized by a perturbation technique, the resulting equation being solved exactly. 14 ref. (Q24, M26)

330-Q. Some Observations on Slip Lines in Iron. H. W. Paxton, M. A. Adams, and T. B. Massalski. *Philosophical Magazine,* ser. 7, v. 43, Feb. 1952, p. 257-258.

Slip lines on the polished surface of body-centered-cubic Fe single crystals are dependent on previous mechanical straining. (Q24, Fe)

331-Q. ISTC Division VIII Review of Boron Steel Development. *SAE Journal,* v. 60, Mar. 1952, p. 26-34. (Excerpts from report by D. L. McBride.)

Mechanical properties, composition, and weldability. Graphs and tabular data. (Q general, K9, AY)

332-Q. Biaxial Fatigue Tests on Flat-Plate Specimens. R. U. Blaser, J. T. Tucker, Jr., and L. F. Kooistra. *Welding Journal,* v. 31, Mar. 1952, p. 161s-168s.

A method of materials testing simulating the state of stress encountered in pressure-vessel service. This method was developed to obtain data on plate materials under cyclic biaxial stress conditions at minimum cost An experimental stress analysis is given for a ¾-in. thick specimen. Methods of detecting initiation of rupture, as well as final appearance of the fatigue fracture. Graphs and photomicrographs. (Q25, ST)

333-Q. Contribution to the Study of the Shape of Tensile Deformation Curves for Monocrystalline Specimens. (In French.) Bernard Jaoul and Charles Crussard. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences,* v. 234, Feb. 11, 1952, p. 700-702.

Factors which determine the shape of the curves and the position of various points on the curve. Illustrated by curves for monocrystalline Al of three degrees of purity. (Q27, Al)

334-Q. Belgian Research on Creep Resistant Steels. (In French.) O. Bihet. *L'Ossature Métallique,* v. 17, Feb. 1952, p. 89-90.

Includes graphical results obtained for four alloy steels. (Q3, AY)

335-Q. Influence of Structure on the Deformation of Metals. (In French.) J. Herenguel. *Métaux: Corrosion—Industries,* v. 27, Jan. 1952, p. 1-13.

Numerous macrographs and micrographs illustrate the concepts discussed, as applied to a variety of ferrous and nonferrous metals and alloys. Includes table showing the relationships of various fabrication processes to structural characteristics. (Q24, M27, M28)

336-Q. New Contribution to the Study of the Influence of Microstructure on the Heat Resistance of Steel. (In French.) Georges Delbart and Michel Ravery. *Revue de Métallurgie,* v. 49, Jan. 1952, p. 67-88.

Creep resistance of a Cr-Mo steel with a low C content varies as a function of microstructure, heat treatment, and load. Effects of preliminary annealing for 1000 hr. at 450 and 575° C., and for 300 hr. at 700° C. Tests were made on low-alloy Cr-Mo steels containing 0.31 and 0.53% C, with which it was possible to obtain more characteristic intermediate structures than with 0.12% C steel. Tables, micrographs, and charts. (Q3, M27, AY)

337-Q. A New Method for the Micromechanical Testing of Metals. (In French.) N. Mironoff. *Revue de la Soudure; Lastijdschrift,* v. 7, no. 4, 1951, p. 214-232.

Alternating-bend tests for determining the ductility of metals. Improvements on old methods. Schematic diagrams, graphs, and photomicrographs. (Q5, Q23)

338-Q. Statistical Investigation of the Tensile Strength of Cast Iron. (In German.) Gustav Meyersberg. *Archiv für das Eisenhüttenwesen,* v. 22, Nov.-Dec. 1951, p. 377-386.

Considerations on the basis of the Weibull formula concerning the breakage probability. Various experiments verifying these considerations. Data are tabulated and illustrated by schematic diagrams. (Q27, CI)

339-Q. Characterization of the Tendency Toward Brittleness of Steel in Notched-Bar Tensile and Tension-Impact Tests. (In German.) Wilhelm Kuntze. *Archiv für das Eisenhüttenwesen,* v. 22, Nov.-Dec. 1951, p. 387-393.

Three main types of brittleness; natural, latent, and shape brittleness. Tests for determining the various types. Data are tabulated and charted. (Q27, ST)

340-Q. Notched-Bar Tensile Tests on Heat Treated Structural Steel. (In German.) Alfred Krisch. *Archiv für das Eisenhüttenwesen,* v. 22, Nov.-Dec. 1951, p. 395-400.

A series of tests on round notched and sharp notched bars at various

temperatures. Results are indicated, data are tabulated and charted; 23 ref. (Q27, CN)

341-Q. Contribution to the Question of Fatigue Strength of Test Pieces of Various Sizes. (In German.) Max Hempel. *Archiv für das Eisenhüttenwesen,* v. 22, Nov.-Dec. 1951, p. 425-436.

A review on the basis of the literature and a series of experiments. Results for a series of carbon and alloy steels are tabulated and charted. 105 ref. (Q7, ST)

342-Q. Improving the Mechanical Properties of Low-Alloy Heat Treatable Steels by Adjusting Temperatures and Times of Heat Treating. (In German.) Walter Eilender, Heinrich Arend, and Werner Neuhaus. *Archiv für das Eisenhüttenwesen,* v. 23, Jan.-Feb. 1952, p. 67-72.

Several steels were investigated in order to improve their tensile and notch-impact strengths. Tabulated results are confirmed by industrial experiments. Tables, graphs, and numerous references. (Q general, AY)

343-Q. Properties and Applications of Commercial Electrical Strain Gages. (In German.) Kurt Fink and Christof Rohrbach. *Archiv für das Eisenhüttenwesen,* v. 23, Jan.-Feb. 1952, p. 75-80; disc., p. 80-81.

Different types of strain gages were investigated. Circuits are illustrated; data are graphed and tabulated. (Q25)

344-Q. The Influence of Impurities on the Properties of Metals. (In Dutch.) J. D. Fast. *Metalen,* v. 7, Jan. 15, 1952, p. 2-12; Jan. 31, 1952, p. 23-27; Feb. 15, 1952, p. 48-50.

Part I: Deleterious effects of inclusions on the mechanical properties of metals and alloys; also favorable effects. Part II: Very useful effects (mechanical hardening, magnetic hardening, and resistance to creep at high temperatures) can be obtained with inclusions formed by precipitation from supersaturated solid solutions. The same effects are deleterious if soft alloys (in the mechanical and magnetic sense) are desired. By studying the effects of carbon and nitrogen in pure Fe and in FeMn, a new explanation of magnetic aging of steel was obtained. Part III: Relationships between presence of inclusions and occurrence of dislocations. Several strain aging phenomena can be explained on the basis of Cottrell's theory; but others do not seem to fit this theory very well. Includes diagrams. 36 ref. (Q general, P16, M26)

345-Q. The Influence of Manganese, Silicon and Iron Contents Upon the Strength Properties of Aluminum-Zinc-Magnesium Alloys. (In German.) W. Mannchen. *Metall,* v. 6, Jan. 1952, p. 24-26.

Investigated on Al-Zn-Mg wires containing 4.5% Zn and 3.5% Mg. Data on tensile strength, elastic properties and shearing strength are tabulated and charted. 14 ref. (Q23, Al)

346-Q. Effect of Surface Condition on Fatigue Bending Strength. (In German.) K. Wellinger and P. Gimmel. *Metalloberfläche,* ser. A, v. 6, Jan. 1952, p. A4-A9.

Results of experiments indicate that metallographic polishing reduces the fatigue bending strength of different steels, and of Armco iron. Relationship of applied stress and of tensile strength to fatigue strength. Tables, graphs, and photomicrographs. (Q7, ST)

347-Q. Internal Friction of Liquid Copper-Silver and Gold-Copper Alloys. (In German.) Erich Gebhardt and Georg Wörwag. *Zeitschrift für Metallkunde,* v. 42, Dec. 1951, p. 358-361.

Experiments using an apparatus previously described and covering a range of temperature. Includes values for density. Data are tabulated and charted. (Q22, P10, Cu, Ag, Au)

348-Q. The Rolling and Recrystallization Textures of Pure Aluminum. (In German.) Hans Joachim Wallbaum. *Zeitschrift für Metallkunde,* v. 42, Dec. 1951, p. 371-376.

X-ray investigations. Investigations show that both types of structure depend on degree of rolling. Types of structures obtained at various rolling temperatures schematically illustrated. 99.5% Al sheet was studied. (Q24, Al)

349-Q. Effect of Lead on Modulus of Elasticity and Damping Properties of Copper, Silver, Ordinary Brass and Red Brass. (In German.) Werner Köster and Lothar Bangert. *Zeitschrift für Metallkunde,* v. 42, Dec. 1951, p. 391-394.

Data for various compositions are charted, tabulated, and discussed. (Q21, Q8, Cu, Ag)

350-Q. Application of the Block Model of Electronic Theory to the Crystal Chemistry of Alloys. IV. Distortion of Simple Structures. (In German.) Konrad Schubert. *Zeitschrift für Metallkunde,* v. 43, Jan. 1952, p. 1-10.

The distorted systems frequently occurring in metallic structures. Possible explanations and effects of various factors. Application to a wide variety of specific alloy systems. Data are charted. 46 ref. (Q24, M26)

351-Q. Properties of Molybdenum and Tungsten at Low and Medium Temperatures. (In German.) Eduard Nachtigall. *Zeitschrift für Metallkunde,* v. 43, Jan. 1952, p. 23-26.

See abstract from *Powder Metallurgy Bulletin,* item 245-Q, 1951. (Q27, Q29, R2, Mo, W)

352-Q. Resistance to Breaking and Cutting. (In Russian.) N. N. Davidenkov. *Izvestiia Akademii Nauk SSSR,* Section of Technical Sciences, May 1951, p. 751-768.

Author's reply to discussion by G. V. Uzhik (Nov. 1950 issue; item 83-Q, 1951). Various questions of strength and plasticity are discussed. 48 ref. (Q23)

353-Q. Letter to the Editor. (In Russian.) N. P. Schchapov. *Izvestiia Akademii Nauk SSSR,* Section of Technical Sciences, May 1951, p. 769-770.

A discussion of the work of G. V. Uzhik in the field of strength and plasticity. (Nov. 1950 issue; item 82-Q, 1951.) Treats the question of stress concentration and the zone of plastic deformation around a fracture. (Q23, Q25)

354-Q. The Phenomena of Plasticity During Brittle Fracture of Soft Steels. (In Russian.) S. O. Tsobkallo. *Izvestiia Akademii Nauk SSSR,* Section of Technical Sciences, June 1951, p. 844-847.

Experimental study demonstrated a zone of plastic deformation in specimens broken at the temperature of liquid oxygen. Data are charted. (Q23, CN)

355-Q. Dependence Between Uzhik's Resistance to Fracture, Yield Strength and True Resistance to Fracture. (In Russian.) V. I. Kudriavtsev. *Izvestiia Akademii Nauk SSSR,* Section of Technical Sciences, June 1951, p. 941-944.

A discussion of the work by G. V. Uzhik in the field of strength and plasticity. Experiments were made which indicate that Uzhik's resistance to breaking is actually resistance to plastic deformation. Data are tabulated and charted. (Q23)

356-Q. The Examination of Sintered Metal Components. L. Northcott and C. J. Leadbeater. "Powder Metallurgy", His Majesty's Stationery Office (London), 1951, p. 23-32.

Includes tensile properties, hardness, density, microstructures, compositions, and frictional characteristics of a number of components of different types. Notes on the manufacture and uses of some of the components. Tabular data. (Q general, P10, M27, Fe, Cu, ST, Pb, Sn, C-n)

357-Q. The Tensile Strength of Titanium at Various Temperatures. R. L. Bickerdike and D. A. Sutcliffe. "Powder Metallurgy", His Majesty's Stationery Office (London), 1951, p. 153-159.

A quantity of Ti was prepared by the reduction of Ti tetrachloride with Mg. It was made into dense bars by powder-metallurgy methods, and from each annealed bar tensile-test pieces were machined. Tensile tests were performed at room temperature, 300, and 500° C.; and the maximum stresses at these temperatures determined. The metal contained about 99.7% Ti. 19 ref. (Q27, H general, Ti)

358-Q. Apparatus For Recording the Compressive Stress-Strain Curve for Thin Material Coupons at Large Strains. B. Bergqvist. *Aeronautical Research Institute of Sweden,* Report 39, 1951. 30 pages.

Apparatus consists mainly of a jig supporting the specimen against excess buckling. Some typical test results. (Q28)

359-Q. Some Aspects of the Charpy Test Applied to Steel Castings. J. E. Black. *American Foundryman,* v. 21, Mar. 1952. p. 56-58.

Serviceable steel castings may be rejected on the basis of Charpy impact tests if the specimens are cut from poorly designed test castings. Experiments show how ever-present micro conditions can be minimized to make impact tests reflect hardenability response and inherent toughness of cast steel. Illustrates how castings producers and Army Ordnance establishments cooperate. (Q6, E general, CI)

360-Q. Hardness Measurements for Determination of Residual Stresses. George Sines and Ronald Carlson. *American Society for Testing Materials,* Feb. 1952, p. 35-37.

Experimental evidence of effect of stress on penetration-hardness measurements. A method for measuring residual stresses by hardness measurements. A brief analysis of the effect of uni-axial stresses predicts the experimental results. Data for Armco iron, carbon steels, brass, Al, and Cu. (Q25, Q29, Fe, CN, Cu, Al)

361-Q. Effect of Cold Drawing on Creep-Resisting Molybdenum-Steel Steam Pipe. E. A. Jenkinson and D. C. Herbert. *Engineering,* v. 173, Mar. 14, 1952, p. 345-347. (A condensation.)

Cold drawing, during the intermediate stages of manufacture, has been used to improve the surface of carbon steel pipes, and these pipes have been put into service after normalizing without apparent detriment to their high-temperature creep resistance. Since the corresponding effect on Mo steel was not known, tests were made on two steels (0.9% Cr + 0.4% Mo and 0.5% Mo + 0.2% V). It was concluded that cold drawing of the two steels improves the surface finish, and does not result in any deterioration of the creep resistance of the steels, provided that the pipes were normalized after cold drawing. Both steels showed no tendency to graphitize on prolonged heating after welding, either in the cold drawn or hot drawn condition. (Q3, M27, AY)

362-Q. Creep of High-Purity Aluminum. *Industrial Heating,* v. 19, p. 432, 434.

Recent National Bureau of Standards research. (Q3, Al)

363-Q. Creep Relationships and Their Application to Pipes, Tubes, and Cylindrical Parts Under Internal Pressure. R. W. Bailey. *Institution of Mechanical Engineers, Proceedings,* v. 164, no. 4, 1951, p. 425-431.

Creep-strain relations for simple and complex stress at any stage of creep—primary, secondary, or tertiary; stress distribution and creep of cylindrical parts under internal pressure, and related formulas for wall thickness; determination of design temperature to provide for specific temperature and pressure fluctuations; and action of creep in removing the thermal-expansion loading of a pipeline. Numerous graphs. (Q3)

364-Q. Creep Under Complex Stress Systems at Elevated Temperatures. A. E. Johnson. *Institution of Mechanical Engineers, Proceedings,* v. 164, no. 4, 1951, p. 432-446.

See abstract from *Aircraft Engineering,* item 172-Q, 1952. (Q3, CN, Al, Mg, Ni)

365-Q. How to Design for Repeated Loads. R. L. Templin and E. C. Hartmann. *Iron Age,* v. 169, Mar. 27, 1952, p. 98-101.

Recommended procedures. "Do's" and "dont's" for obtaining increased fatigue strength are presented in tabular form. (Q7)

366-Q. Determination of Elastic Constants and Stress-Strain Relationship to Fracture of Sintered Tungsten Carbide-Cobalt Alloys. E. Lardner and N. B. McGregor. *Journal of the Institute of Metals,* v. 80, Mar. 1952, p. 369-374.

Results of experiments show that, at room temperature, Young's modulus decreases considerably, and Poisson's ratio increases slightly, with rise in Co content. Determinations of Young's modulus between room temperature and 600° C. indicate a total decrease of the order of 5-6% at 600° C., the rate of decrease being almost uniform and independent of the amount of Co. There is evidence from the stress-strain relationship that when Co exceeds about 11%, some plastic deformation occurs at stresses well below the room-temperature fracture strength. Graphs and tables. (Q21, W, Co, C-n)

367-Q. The Stress-Strain Diagram of Timepiece Springs. (In Japanese.) Tetsutaro Mitsuhashi, Ryuichi Nakagawa, and Saburo Saito. *Journal of Mechanical Laboratory,* v. 5, Oct. 1951, p. 247-251.

To determine permanent set, an apparatus was developed to record the stress-strain curve. The specimen was high-carbon steel wire drawn to 0.5 mm. diam. Apparatus is diagrammed. Data are charted and tabulated. (Q27, CN, SG-b)

368-Q. Wear and Damage to Underground Pumps. II. (In Japanese.) Ichiro Onuma. *Journal of Mechanical Laboratory,* v. 5, Oct. 1951, p. 252-261.

204 pumps located in a Japanese coal mine were inspected. Causes of breakdown are allocated percentagewise to the following causes: wear, corrosion, seizure, and others, for the various parts. Data are charted and tabulated; diagrams show the parts involved. (Q9, R8)

369-Q. Studies of the Application of Materials. (In Japanese.) **VIII. Evaluation of Spring Steel.** Hisao Matsumoto and Kaoru Kamada. **IX. The Mechanism of Tensile Failure of Chain.** Hisao Matsumoto, Katsuyoshi Kimura, and Kaoru Kamada. *Journal of Mechanical Laboratory,* v. 5, Oct. 1951, p. 235-240; Nov. 1951, p. 279-284.

Results of experiments are tabulated, charted, and analyzed. (Q general, AY, CN)

370-Q. Wear of Steel Against Soils. III. (In Japanese.) Tetsutaro Mitsuhasi, Yutaka Imai, and Shin Yokoi. *Journal of Mechanical Laboratory,* v. 5, Nov. 1951, p. 294-298.

Using the hand drill type of wear-testing machine, three carbon steels and a 1.56% Cr steel were studied. Results are charted and tabulated. (Q9, CN, AY)

371-Q. A Constant Stress Creep Test Apparatus. A. Latin. *Journal of Scientific Instruments,* v. 29, Mar. 1952, p. 98-99.

Briefly described and diagrammed. (Q3)

372-Q. How Can We Appraise Metals for High-Temperature Service? Thomas J. Dolan. *Metal Progress,* v. 61, Mar. 1952, p. 55-60.

Principal observations on the factors influencing the fatigue strength of metals at high temperatures. (Q7, AY, CN, SG-h)

373-Q. Course of Impact Fracture. L. H. Satz. *Metal Progress,* v. 61, Mar. 1952, p. 79-80.

Impact tests made on welded stainless bars. The path of fracture was apparently influenced by the presence of tougher material in the immediate vicinity. (Q6, SS)

374-Q. Typical Properties of Beryllium-Copper Alloys. J. T. Richards. *Metal Progress,* v. 61, Mar. 1952, p. 80B.

A data sheet. (Q general, P general, Cu)

375-Q. Effect of Hydrogen on Low-Alloy Steels. *Metal Progress,* v. 61, Mar. 1952, p. 114, 116, 118.

See abstract of "Effect of Hydrogen on the Properties of Low-Alloy Steels", J. D. Hobson and C. Sykes, *Journal of the Iron and Steel Institute;* item 67-Q, 1952. (Q23, AY)

376-Q. Creep Properties of Austenitic Alloys. *Metal Progress,* v. 61, Mar. 1952, p. 156, 158, 162.

See abstract of "Creep Properties of Austenitic Alloys in Relation to the Constitution Diagram", A. M. Borzdyka, *Doklady Akademii Nauk SSSR,* item 43-Q, 1951. (Q3, Fe, Cr, Ni)

377-Q. A Note on Estimating Yield-Point Loads in a Plastic-Rigid Body. R. Hill. *Philosophical Magazine,* ser. 7, v. 43, Mar. 1952, p. 353-355.

Limits are obtained for the error involved in use of an approximate theory of plasticity to estimate yield-point loads. Illustrates these by using the Mises yield function and potential to approximate the Taylor-Quinney data for Cu and Al. (Q23, Cu, Al)

378-Q. Effect of Strain Ageing Upon the Distribution of Glide Bands in Cadmium Crystals. D. F. Gibbons. *Proceedings of the Physical Society,* v. 65, sec. B, Mar. 1, 1952, p. 193-195.

There is a marked difference in the distributions of visible glide bands, after plastic deformation, between Cd crystals containing small amounts of N_2 and those relatively free from N_2. The distribution of glide bands in the crystals containing N_2 is compared with Lüders bands in strain aged mild steel. (Q24, Cd, CN)

379-Q. On Cracks and Dislocations in Shafts Under Torsion. Alexander Weinstein. *Quarterly of Applied Mathematics,* v. 10, Apr. 1952, p. 77-80.

Mathematical analysis. 10 ref. (Q1)

380-Q. The Bauschinger Effect in Iron Single Crystals. N. H. Polakowski. *Research,* v. 5, Mar. 1952, p. 143-144.

Results of experiments on large iron single crystals. (Q24, Fe)

381-Q. Hydrogen Causes Embrittlement of Forged Compressor Blades. A. E. Durkin. *Steel,* v. 130, Mar. 24, 1952, p. 76, 78.

Failure of stainless steel blades and its prevention. Electrolytic surface corrosion builds up H_2 pressure, resulting in eventual cracking. Painting decreases susceptibility to embrittlement. (R1, Q23, SS)

382-Q. What Boron Steels to Use—and Why. H. B. Knowlton. *Steel,* v. 130, Mar. 24, 1952, p. 84, 86.

Properties of boron steel and basis for its substitution for critical alloys. (Q general, AY)

383-Q. The Torsion Test for Wire. J. G. Walford. *Wire Industry,* v. 19, Mar. 1952, p. 233-235, 280.

Effect of specimen length and tensile stress on the number of twists to fracture. (Q1, CN)

384-Q. Measurement and Calculation of Stresses in a Flywheel. (In Italian.) G. Oberti and G. Moravia. *Metallurgia Italiana,* v. 44, Feb. 1952, p. 78-82.

Experimental technique followed in measuring, by means of electrical resistance strain gages, the strains arising from centrifugal forces in a large flywheel. Simultaneous theoretical calculation. Good agreement was achieved. (Q25)

385-Q. The Structure of Cast Iron Rolls. (In Polish.) J. Jastrzebska. *Prace Glownego Instytutu Metalurgii,* v. 3, no. 6, 1951, p. 463-489.

General working conditions for cast iron calibrated grain rolls as well as for chilled rolls intended for sheet. The effects of microstructure and macrostructure of the rolls on mechanical properties. Cast iron rolls used in Poland in section rolling mills are classified and optimum structures established on the basis of tests and analysis of structures, wear statistics, and comparison of structures of Polish and foreign rolls. Tables, graphs, and micrographs. 14 ref. (Q general, M27, T5, CI)

386-Q. Some Factors Affecting Creep of Carbon Steel. (In Polish.) Z. Borysowski and W. Tomaszczyk. *Prace Glownego Instytutu Metalurgii,* v. 3, no. 6, 1951, p. 507-515.

Effects of chemical composition and other metallurgical factors. Results are charted and tabulated. 21 ref. (Q3, CN)

387-Q. Electronics in Automobile Engineering Research. J. R. Bristow. *Electronic Engineering,* v. 24, Apr. 1952, p. 189-192.

Use for measuring stress in vehicle structures, torsional fatigue, road performance parameters, and noise in vehicles. (Q25, Q7)

388-Q. A New Development in Bonded Electric Wire Resistance Strain Gauges. A. U. Huggenberger. *Engineers' Digest,* v. 13, Mar. 1952, p. 77-79. (Translated and condensed.)

Previously abstracted from the *Schweizer Archiv für angewandte Wissenschaft und Technik.* See item 219-Q, 1952. (Q25)

389-Q. Effect of Basic Cupola Operation on Tensile Strength of Gray Iron. W. T. Bourke and T. J. Wood. *Foundry,* v. 80, Apr. 1952, p. 86-87, 217-218.

Summary of results obtained on a full-scale pilot operation. (Q27, E10, CI)

390-Q. Reinforcing Steel in Concrete and the Concept of Safety. K. Hajnal-Konyi. *Journal of the American Concrete Institute,* v. 23, Mar. 1952; *ACI Proceedings,* v. 48, 1952, p. 561-580.

Comparative tests on 36 beams re-

grade concrete, prove the superiority of cold worked steel over steel having a natural yield point, as regards safety factor and warning before failure. They also prove advantages of deformed bars over plain bars. (Q23, CN)

391-Q. The Hot-Torsion Test for Assessing Hot-Working Properties of Steels. D. E. R. Hughes. *Journal of the Iron and Steel Institute,* v. 170, Mar. 1952, p. 214-220.

The design and construction of a hot-torsion testing machine, and a suitable experimental technique. Tests on mild steel and high-carbon Cr steel specimens over the ranges 950-1400° C. and 12-600 r.p.m., respectively, were made. Results are charted, tabulated, and discussed. Macrographs and micrographs show structures of broken test specimens. 12 ref. (Q1, CN, AY)

392-Q. Discussion on the Paper—Physical and Mechanical Properties of Segregates in Two Alloy Steels, by H. M. Finniston and T. D. Fearnehough. *Journal of the Iron and Steel Institute,* v. 170, Mar. 1952, p. 221-225.

Paper published in Sept. 1951 issue; item 680-Q, 1951.
(Q general, M27, AY)

393-Q. Viscous Creep of Gold Wires Near the Melting Point. F. H. Buttner, E. R. Funk, and H. Udin. *Journal of Metals,* v. 4, Apr. 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 194, 1952, p. 401-407.

Gold wires, 5 mil. in diam., were found to creep viscously up to approximately 5.5×10^6 dynes per sq. cm. around 1300° K. Beyond this point, an additional slip mechanism appears. Observations made during the experiments agree with Herring's predictions. Graphs and tables. 21 ref. (Q3, Au)

394-Q. Properties of Molybdenum Made by Arc Casting and Powder Metallurgy. James H. Bechtold and Howard Scott. *Metal Progress,* v. 61, Apr. 1952, p. 82-88.

Metal preparation, tensile properties, ductility, creep-rupture tests, and alloying for improvements.
(Q23, Q3, H general, E10, Mo)

395-Q. Problems of Metallic Fatigue at High Temperature. Thomas J. Dolan. *Metal Progress,* v. 61, Apr. 1952, p. 97-104.

Some specific alloys and special tests for severe services at high temperatures. In addition to high mechanical strength at elevated temperature, it is desirable that an alloy exhibit good ductility; resistance to erosion, oxidation, or chemical attack; high fatigue strength; and adequate stability. Tables and graphs. (Q7, SG-g, h)

396-Q. Friction and Wear at High Speeds and Pressures. *Metal Progress,* v. 61, Apr. 1952, p. 114, 116, 118, 120. (Condensed from "Preliminary Investigation of Wear and Friction Properties Under Sliding Conditions of Materials Suitable for Cages of Rolling-Contact Bearings", R. L. Johnson, M. A. Swikert, and E. E. Bisson.

Previously abstracted from *National Advisory Committee for Aeronautics,* Technical Note 2384. See item 459-Q, 1951.
(Q9, ST, Be, Cu, Ni, Al, Fe)

397-Q. Investigation of Fretting by Microscopic Observation. Douglas Godfrey. *National Advisory Committee for Aeronautics,* Report 1009, 1951, 10 pages.

An experimental investigation, using microscopic observation and color motion photomicrographs, was conducted to determine the cause of fretting. Glass and other noncorrosive materials, as well as metals, were used as specimens. A simple apparatus vibrated convex surfaces in contact with stationary flat surfaces at frequencies of 120 cycles or less than 1 cycle per sec., an amplitude of 0.001 in., and a load of 0.2 lb. Fretting of clean nonmetals and metals occurred readily, and glass microscope slides and steel balls provided an excellent method for visual studies. (Q9)

398-Q. Effect of Heating at 200 and 500° F. on the Properties of Aluminum and Copper Wires. Allen S. Russell. *Wire and Wire Products,* v. 27, Mar. 1952, p. 255-256.

Limited investigation of the effect of heating in air at 300 and 500° F. on electrical and tensile properties of annealed Cu and hard drawn Al wires. Tabular data.
(Q27, P15, Cu, Al)

399-Q. Beryllium Copper Wire: Property and Design Considerations. John T. Richards. *Wire and Wire Products,* v. 27, Mar. 1952, p. 257-262, 303-307.

Physical, mechanical, and corrosion-resistant properties. Certain design features; a modified design may prove more advantageous than making a direct substitution of another material for Be-Cu. Tabular data. 20 ref.
(Q general, P general, R general, Cu)

400-Q. The Question of Strength Criteria. (In Russian.) G. I. Gurevich. *Doklady Akademii Nauk SSSR,* new ser., v. 82, Jan. 11, 1952, p. 245-248.

A theoretical discussion of equations describing the relationships of stress and strain in a uniform isotropic body. (Q23)

401-Q. (Book) Buckling Strength of Metal Structures. Friedrich Bleich and Lyle B. Ramsey. 508 pages. 1952. McGraw-Hill Book Co., 330 W. 42nd St., New York 18, N. Y. $10.00.

Data on behavior of fabricated steel structures under compression loading. Covers available literature on the subject and much original work. Concentrates on problems frequently encountered in the design of engineering and naval structures. Numerous references, formulas, tables, graphs. (Q28)

402-Q. (Book) Mechanical Tests for Metals (Excluding Welds). British Standard Handbook No. 13, 243 pages. 1951. British Standards Institution, 24 Victoria St., Westminster, London, S.W. 1, England. 17/6 net.

Standards, dealing solely with mechanical testing, together with extracts from other standards to illustrate particular applications of the tests, have been collected to form a new handbook. Numerous illustrations; comprehensive tables.
(Q general, S22)

403-Q. (Book) Molesworth's Handbook of Engineering Formulae and Data. Ed. 34. Albert Peter Thurston, editor. 1672 pages. 1951. E. & F. N. Spon, Ltd., 22 Henrietta St., London, W. C. 2, England.

Civil and general engineering. Includes data on materials of construction and extensive welding information.
(Q general, T26, K general)

404-Q. (Book) Strength of Materials. Max M. Frocht. 439 pages. 1951. Ronald Press Co., 15 E. 26th St., New York.

Contemporary problems and methods of investigating strength of materials. First three chapters deal with fundamental concepts and statically determinate problems in tension, compression, bending, and torsion. Remaining chapters give detailed discussion on various aspects of strains and stresses. Chapter problems. (Q23)

405-Q. (Book) A Symposium on the Plastic Deformation of Crystalline Solids. 223 pages. 1950. Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C.

Covers meeting held at Mellon Institute, Pittsburgh, May 19-20, 1950, under joint sponsorship of Carnegie Institute of Technology and Office of Naval Research. Individual papers are separately abstracted. (Q24)

R

CORROSION

148-R. Lubricant Corrosion Is Being Licked. *Chemical and Engineering News,* v. 30, Mar. 17, 1952, p. 1098.

How MoS_2 can be used to prevent fretting corrosion of closely fitted machine parts. Design factors are considered as a means of eliminating crevice corrosion in engines.
(R1)

149-R. The Use of Radioactive Tracers in the Study of the Mechanism of Action of Corrosion Inhibitors. D. M. Brasher and E. R. Stove. *Chemistry & Industry,* Feb. 23, 1952, p. 171-172.

Work primarily on the mechanism of the inhibitive action of sodium benzoate; but, in view of the excessive cost of sodium benzoate containing C^{14}, it was decided to develop the necessary microtechnique by preliminary work with radioactive K_2CrO_4. (R10, S19)

150-R. Alternate Immersion Corrosion Test Equipment; Improvements in Design. Chuk-Ching Ma. *Industrial and Engineering Chemistry,* v. 44, Mar. 1952, p. 583-585.

Characteristic features are the hanging of the specimen in a horizontal position to insure equal duration of immersion of all parts of the specimen, and the continuous up and down movement of the specimen. (R11)

151-R. Corrosion. Mars G. Fontana. *Industrial and Engineering Chemistry,* v. 44, Mar. 1952, p. 89A-90A, 92A.

Corrosion of stainless steels by H_2SO_4 as a function of temperature. A note on iron-blast-furnace slag.
(R5, SS)

152-R. The Reaction of Cerium With Oxygen. Daniel Cubicciotti. *Journal of the American Chemical Society,* v. 74, Mar. 5, 1952, p. 1200-1201.

Oxidation of Ce was found to obey the parabolic law from 30 to 125° C. Above 125° C. the reaction started parabolically, but subsequently became linear. The parabolic portion became shorter as the temperature was increased. Ce is the most rapidly oxidizing metal yet studied. Energy of activation of the parabolic reaction is the smallest yet observed.
(R2, Ce)

153-R. Corrosion History of a Domestic Hot Water System. John R. Baylis. *Journal, American Water Works Association,* v. 44, Mar. 1952, p. 224-238.

Analyzes the condition of a hot-water tank after 22½ years of use. The tank was galvanized iron, 30-gal. capacity, with metal thickness of 0.08 in. It was connected to a furnace heater and to a gas heater.
(R4, Fe, Zn)

154-R. Corrosion. *Oil and Gas Journal,* v. 50 Mar. 17, 1952, p. 203-210, 212-213, 216, 220, 224.

Questions and answers on corrosion types—causes and prevention, cathodic protection, materials used to fight corrosion, applications—equipment, environment, and testing. 28 ref. (R general)

155-R. Engineering Inspection for Corrosion Control. F. A. Upson. *Oil and Gas Journal,* v. 50, Mar. 17, 1952, p. 227-228, 231-232.

A program which maintains a constant and accurate check on equipment service. An orderly system of records in turn provides valuable information for the prevention of accidents, development of corrective measures, and design of future operating units. (R11)

156-R. How to Combat Corrosion in Processing Oil and Gas. Marshall E. Parker. *Oil and Gas Journal,* v. 50, Mar. 17, 1952, p. 235-244.

Discusses each of the basic and special types of corrosion. Losses caused by corrosion; weapons against corrosion; corrodents in the refinery; detection and diagnosis of corrosion; designing against corrosion; corrosion-testing methods; and controlling unanticipated corrosion. (R general)

157-R. Low-Temperature Corrosion in a Crude-Distillation Tower. T. N. Griswold. *Oil and Gas Journal,* v. 50, Mar. 17, 1952, p. 247-248, 250, 255.

Causes, tests with steel, Monel, and cast iron; and control by desalting and NH_3 injection. (R7, ST, Ni, CI)

158-R. Applications of Cathodic Protection to Control Refinery Corrosion. V. W. Hatchett. *Oil and Gas Journal,* v. 50, Mar. 17, 1952, p. 256, 258-259, 261-262, 264.

The sacrificial-anode procedure and induced-current method; case histories for each. Includes economics of cathodic protection. (R10)

159-R. Cities Service Tackles Brackish-Cooling-Water Corrosion. J. J. Picarazzi. *Oil and Gas Journal,* v. 50, Mar. 17, 1952, p. 271-272, 274, 276, 279-280, 282.

Methods used for combating the problem. Screening, analysis, and intermittent chlorination of water; use of special tube materials and coatings. Materials included Al brass ferrules in Admiralty metal tubing; 70-30 Cu-Ni tube sections; and Alclad tubes. Internal appearance of used tubes. (R4, Cu, Al)

160-R. How Gulf Oil Corp. Reduces Furnace Tube-End Corrosion. F. C. Braun. *Oil and Gas Journal,* v. 50, Mar. 17, 1952, p. 285-286, 288-289.

Excessive deterioration in the rolled ends of carbon or low-alloy steel tubes is related to stresses set up during expansion, distortion of metal structure, and erosion caused by turbulence at the internal offset formed by the expander during the rolling operation. Other remedial methods evaluated are safe ending, high-alloy end liners, and inside-upset tube ends. (R7, CN, AY)

161-R. How to Control Internal Corrosion of Crude Still Condensers. Marion J. Wilcox and Franklin M. Watkins. *Oil and Gas Journal,* v. 50, Mar. 17, 1952, p. 290-293.

Use of organic inhibitors. (R7, R10)

162-R. Preliminary Report on Effect of Spillage on Hot-Applied Coal-Tar Coatings. Carl Miller. *Oil and Gas Journal,* v. 50, Mar. 17, 1952, p. 294-295.

Spillage of petroleum products has little effect on narrow-range enamels; wide-range enamels are not satisfactory. The effect of gasoline, kerosine, and fuel oil on hot-applied coal-tar enamels used for protection against corrosion. (R7, L26)

163-R. Salt-Water Corrosion in Refinery Cooling Equipment. Byron M. Beildeck and O. F. Noss, Jr. *Oil and Gas Journal,* v. 50, Mar. 17, 1952, p. 296, 299-300, 302, 304.

Investigation to determine magnitude and causes of the increase in corrosion and to study the salt-water system in as many phases as necessary to determine what changes should be made to improve the situation. (R4)

164-R. Magnolia Reduces Furnace Corrosion in Polyformer. J. J. Baker. *Oil and Gas Journal,* v. 50, Mar. 17, 1952, p. 306, 309, 316.

Corrosion was reduced by installation of higher alloy steel. Graphs and tabulated data. (R7, AY)

165-R. Production-Proved Inhibitor Gets Results in Refineries and Natural-Gasoline Plants. Forrest E. Love. *Oil and Gas Journal,* v. 50, Mar. 17, 1952, p. 310-312.

An organic corrosion inhibitor used in refineries to afford protection in practically every kind of refining process and against most types of corrosion encountered by refiners is called Kontrol, manufactured by Tretolite Co. A possible exception is high-temperature, furnace-tube corrosion. Brief summary of different installations where the material is in service. (R10)

166-R. Case Histories of Corrosion Problems and Use of Protective Coatings in Their Solution. I. Interior Tank Corrosion. W. B. Cook. *Oil and Gas Journal,* v. 50, Mar. 17, 1952, p. 313-316.

Various instances encountered at Gulf Oil Corp.'s Port Arthur refinery. (R7, L general)

167-R. Cathodic Protection of Pipe Underground. *Petroleum Engineer,* v. 24, Mar. 1952, p. D46, D48.

See abstract of "Potential and Current Requirements for the Cathodic Protection of Steel in Soils", W. J. Schwerdtfeger and O. N. Dorman, *Journal of Research of the National Bureau of Standards;* item 380-R, 1951. (R10, ST)

168-R. Is Corrosion Resistance Your Problem? Aluminum Die Castings Give Good Service in the Presence of Soap and Detergents. *Precision Metal Molding,* v. 10, Mar. 1952, p. 38, 81-83.

(R7, T29, Al)

169-R. Black Spots on Brass. (In French and German.) Paul Ducommun. *Pro-Metal,* v. 4, Dec. 1951, p. 925-927.

Proposes an explanation of this phenomenon. Because of differential aeration, corrosion results from the formation of small galvanic concentration cells in wet spots between brass plates. Experiments verifying the theoretical explanation. (R1, Cu)

170-R. Staining of Copper Alloys After Pickling in Sulphuric Acid. A. L. Simmons. *Australian Journal of Applied Science,* v. 2, Dec. 1951, p. 464-472.

Investigation carried out with Cu-Zn alloys and nickel silvers shows that acid carried over into the rinse water after pickling is a major cause of staining during subsequent storage. (R5, Cu, Zn)

171-R. Dissolving Velocity of Metals in Deutero-Electrolytes. (In English.) J. Brun. *Acta Chemica Scandinavica,* v. 5, Nos. 9-10, 1951, p. 1402-1404.

Experiments dealing with the dissolution of Zn, Al, and Fe in acids and bases, the hydrogen content of which has been partly or completely replaced by deuterium. Data are tabulated. (R5, Zn, Al, Fe)

172-R. Corrosion Inhibitors and Promoters in Liquid Media. (In French.) L. Cavallaro and A. Indelli. *Revue de Métallurgie,* v. 49, Feb. 1952, p. 117-124.

Results of studies of the action of chromates and nitrates on carbon steel in a neutral medium and on stainless steel in an acid medium; corrosion of a carbon steel—stainless steel couple; effect of sulfurous anhydride; and rate of corrosion. Tables and graphs. 26 ref. (R10, CN, SS)

173-R. The Corrosion of Cadmium and Zinc Coatings. (In German.) G. Schikorr. *Metalloberfläche,* ser. A, v. 5, Dec. 1951, p. A177-A185.

Comparative quantitative experiments. Results are tabulated and charted. 22 ref. (R11, Cd, Zn)

174-R. Short-Time Testing of Electrolytic Chromium-Nickel Coatings for Corrosion Resistance. (In German.) Hermann Hefele. *Metalloberfläche,* serv. B, v. 4, Feb. 1952, p. B17-B24.

Compares atmospheric corrosion with results of various accelerated corrosion tests. Porosity tests, and causes of corrosion-increasing pores, blisters, and cracks in Cr-Ni electrodeposits. Photomicrographs, tables, diagrams, and graphs. 21 ref. (R11, L17, Cr, Ni)

175-R. Coating of Freshly Passivated Iron and Its Relationship to Refractory Properties. (In German.) Klaus J. Vetter and Hans-Jurgen Booss. *Zeitschrift für Elektrochemie Berichte der Bunsengesellschaft für Physikalische Chemie,* v. 56, Jan. 1952, p. 16-19.

The black coating formed during the passivation of iron with HNO_3 increases in thickness and blackness with carbon content. Experiments showed the coating to be Fe_3C and that refractoriness decreases because of the reducing action of this carbide. Data are tabulated and graphed. (R10, Fe)

176-R. The Influence of Ammonium Salts on the Corrosion of Powdered Copper. (In Russian.) A. V. Pomosov, T. N. Rogatkina, and A. I. Levin. *Zhurnal Prikladnoi Khimii,* v. 24, July 1951, p. 720-722.

Experimental study shows that the volatility of the acid forming the anion of the salt is the basic factor determining the corrosion activity of the salt. Data are tabulated. (R6, Cu)

177-R. The Problem of Atmospheric Corrosion of Copper Powder. (In Russian.) A. V. Pomosov and A. I. Levin. *Zhurnal Prikladnoi Khimii,* v. 24, July 1951, p. 723-726.

The corrosion of Cu powder by dry and moist vapors (H_2S, SO_2, CO_2, HCl and NH_3) was investigated. Data are tabulated. (R3, Cu)

178-R. Is Cathodic Protection Justified on Lines With Superior Coating? Marshall E. Parker. *American Gas Journal,* v. 176, Mar. 1952, p. 14-15, 42.

Refers to underground pipelines. Corrosion engineers answer above question in the affirmative, even if the soil traversed is only mildly corrosive. (R10, CN)

179-R. Preventing Intergranular Corrosion Due to Welding Stainless. Stanley C. Orr. *Chemical Engineering,* v. 286, 288, 290, 292-294, 296.

Merits of the three principal ways and reasons why heat treatment is often better than the use of stabilized and extra-low-carbon stainless steels. Diversion of Cb—formerly available as a stabilizing agent—to high-strength and heat-resistant alloys is only one factor favoring the heat treatment method. (R10, J23, SS)

180-R. The Electrical Nature of Corrosion and Cathodic Protection. H. D. Holler. *Electrical Engineering,* v. 71, Apr. 1952, p. 367-373.

This study of corrosion from the electrical standpoint is an evaluation of the behavior of galvanic couples in accordance with the laws of electricity. 16 ref. (R1, R10)

181-R. Corrosion Resistance of Alloys at High Temperatures Studied at Inco Laboratories. *Industrial Heating,* v. 19, Mar. 1952, p. 450.

Research program and procedures. (R11, SG-h)

182-R. A Spectrophotometric Study of the Oxidation of Tantalum. J. T. Waber, G. E. Sturdy, E. M. Wise, and C. R. Tipton, Jr. *Journal of the Electrochemical Society*, v. 99, Mar. 1952, p. 121-129.

See abstract from *U. S. Atomic Energy Commission*, AEC-1355; item 384-R, 1951. (R2, Ta)

183-R. Corrosion Resistance of the Weld Zone in Stainless Steels. (In Japanese.) Tetsutaro Mitsuhashi, Yutaka Imai, Manabu Ueno, and Toshiaki Hagiwara. *Journal of Mechanical Laboratory*, v. 5, Oct. 1951, p. 262-268.

Data are tabulated and charted for various chemical solutions and stainless steel compositions encountered in the Japanese textile industry. Results are summarized in English. (R5, SS)

184-R. Experts Voice Opinions in Agreement and Rebuttal on "A Critical Look at Salt Spray Tests." *Materials & Methods*, v. 35, Mar. 1952, p. 77-81, 156, 158, 160, 162, 164, 166, 168.

Comments on Frank LaQue's article (in last month's issue; item 95-R) differ widely, but most users and specifiers agree that there is room for improvement in the tests and their application. (R11)

185-R. Liquid Sodium—a Noncorrosive Coolant. R. F. Koenig and S. R. Vandenberg. *Metal Progress*, v. 61, Mar. 1952, p. 71-75.

The corrosive properties of liquid Na in contact with several stainless steels and high-Ni alloys; several test methods. The most fundamental approach employs solubility studies. Small containers of the material being tested are filled with Na, and samples of the Na are removed after suitable periods of heating. Chemical analysis of the samples provides solubility data. From this and metallographic examination of the containers, an indication of rate, extent, and manner of attack was obtained. Other methods, including those revealing effect on mechanical properties. (R6, P13, SS, Ni)

186-R. Trends in Corrosion Control. Herbert H. Uhlig. *Metal Progress*, v. 61, Mar. 1952, p. 82-88.

Reviews corrosion since 1900. Superstition and science; evaluating corrosion rate of metals and alloys; paints; metallic and nonmetallic coatings; cathodic protection, and role of the corrosion engineer. (R general)

187-R. Corrosion in Monoethanolimine Solutions. Marshall E. Parker. *Oil and Gas Journal*, v. 50, Mar. 31, 1952, p. 122.

Development of the amine process for removal of acid gases from natural and refinery gas, together with the later combination amine-glycol process for simultaneous removal of water, brought in its wake a set of corrosion problems. Modification of process conditions, and the use of Al 3S alloy, Al 3S Alclad, and 4-6 Cr, 1/2 Mo steel have proved to be satisfactory for preserving tubes in this service. (R7, Al)

188-R. Study on the Anodic Passivation of Lead, Part I. Effect of Cl^- and Co^{++} Ions on the Passivation of Lead in Zinc Sulfate Solution. (In Polish.) M. Smialowski and E. Przybyla. *Prace Glownego Instytutu Metalurgii*, v. 3, no. 6, 1951, p. 501-505.

The change of lead anode potential with time was studied experimentally at various current densities, using a Curie electrometer and a photographic recorder. Typical potential-time curves obtained under "normal" experimental conditions. Results obtained with pure Pb anodes and with Pb anodes containing 1% Ag are compared. (R10, Pb)

189-R. Protection of Metallic Structures From Corrosion in Soil by the Use of Protectors. (In Russian.) A. F. Lunev and G. V. Akimov. *Izvestiia Akademii Nauk SSSR*, Section of Chemical Sciences, July-Aug. 1951, p. 361-369.

Experiments were made to evaluate the cathodic protection action of Mg, a Mg-Zn-Al alloy, an Al-Zn alloy, and Zn on iron structures exposed to underground corrosion. Cylindrical casings of Mg or the Mg alloy were found to be superior. Filling the casings with $CaSO_4$, $CaSO_4$ + $MgSO_4$ and similar compounds added to the protective action. Results are tabulated and charted. (R10, Fe, ST)

190-R. Performance of Magnesium Galvanic Anodes in Underground Service. Oliver Osborn and H. A. Robinson. *Corrosion* (Technical Section), v. 8, Apr. 1952, p. 114-129; disc., p. 129.

Reviewed in the light of past 5 years of field testing in which 2500 anodes have been tested in some 40 different backfills and in various soils. Pertinent indices of galvanic-anode performance: various factors influencing the performance of Mg anodes. (R10, Mg, ST)

191-R. Radiant Heating Systems Need Cathodic Protection Too. J. F. Hirshfeld and L. P. Schaefer. *Corrosion (Technical Section)*, v. 8, Apr. 1952, p. 140-142.

Cathodic-protection systems installed in two bus garages of the Detroit City Dept. of Street Railways to avoid replacement of a radiant heating system. The protection system consisted of graphite anode rods installed under the concrete floor connected to Se rectifiers of appropriate capacity. Pipes are steel or wrought iron. (R10, ST, Fe)

192-R. Physical Chemical Aspects of Corrosion Inhibition. Norman Hackerman. *Corrosion* (Technical Section), v. 8, Apr. 1952, p. 143-148; disc., p. 148-149.

Some of the basic physical and chemical phenomena which occur during inhibition of corrosion of metals by liquid environments. The way in which each of these may be involved and their relative importance in the overall process. Several recent researches in this field. 26 ref. (R10)

193-R. Corrosion Problems of the Railroads. L. S. Crane. *Corrosion* (Technical Section), v. 8, Apr. 1952, p. 149-151. (*Reprinted from Railroad Corrosion News Letter*, v. 1, Jan. 1952).

Major corrosion problems of railroads and remedies include bridge painting, brine-drippings damage, car painting, steam-boiler corrosion cracking, diesel engine corrosion difficulties with cylinder liners, bearing and injection systems, trackage losses from stress, humidity, and mechanical deficiencies. Work of the American Railway Engineering Association in redesign of rail-fillet area to give better stress distribution (R general, Q25, ST)

194-R. High Temperature Scale Resistance. Albert M. Portevin. *Metal Progress*, v. 61, Apr. 1952, p. 94-95.

Briefly reviews general principles for getting good chemical resistance at high temperatures in metals and alloys. Deals with refractories used in metallurgical processes to increase oxidation resistance. (R2)

195-R. "Whiskers" on Metal Surfaces. *Metal Progress*, v. 61, Apr. 1952, p. 172, 174. (Condensed from "Filamentary Growths on Metal Surfaces—Whiskers", K. G. Compton, A. Mendizza, and S. M. Arnold.)

Previously abstracted from *Corrosion*. See item 422-R, 1951. (R general, Ti)

196-R. Avoid Blade Corrosion and Erosion. W. H. Lloyd. *Power*, v. 96, Apr. 1952, p. 94-97, 206.

Inspection, correction, and restoration aspects of corroded blades for steam turbines. Material mainly used is 12%-Cr steel. (R general, SS)

197-R. Prevention of Corrosion of Ships in Sea Water by Means of Cathodic Protection. K. N. Barnard. *Research*, v. 5, Mar. 1952, p. 116-125.

General experience of the Naval Research Establishment, Halifax, Nova Scotia, with cathodic protection as a means of preventing the corrosion of shipping in sea water; some of the economical aspects of the use of such a system. Use of Mg anodes as a means of protection. (To be continued.) (R10, Cr)

198-R. Sweet Oil Well Corrosion. H. L. Bilhartz. *World Oil*, v. 134, Apr. 1952, p. 208, 210, 213-214, 216.

Problems of high-pressure and low-pressure sweet oil well corrosion from a standpoint of investigative approach, criteria, causative agents, and remedial measures. Preliminary findings of representatives of 30 companies. Includes use of plastic-coated tubing, nickel tubing, and galvanized or Ni-plated pipe. Diagrams and photographs. (R7, ST, Ni, Zn)

199-R. Metal-Plated Fabric Substitute for Wire Gauze: Laboratory Tests for Durability. "Textiles and Their Testing," His Majesty's Stationery Office (London), 1951, p. 41-44. (Based on R.A.E. Report by F. Millard and E. Whatham.)

A sample of metal-plated textile fabric proposed as a substitute for 200-mesh gauze in refueling funnels, as a separating medium for water, was tested for durability after cyclical immersion in sea water at room temperature, and accelerated aging in a moist atmosphere at 70° C. Ni and Cu were used. (R4, Ni, Cu)

200-R. Further Laboratory Durability Tests on Metal-Plated Fabric As a Substitute for Wire Gauze. "Textiles and Their Testing," His Majesty's Stationery Office (London), 1951, p. 45-50. (Based on R.A.E. Report by F. Millard.)

Weathering tests and resistance of material to wear and puncture. Ni and Cu were used. Data are tabulated. (R3, Q9, Ni, Cu)

201-R. (Pamphlet) **Interim Report of the Departmental Committee on the Deterioration of Cast Iron and Spun Iron Pipes.** British Ministry of Health, 1950, 48 pages. 3s, 6d.

Mainly concerned with external deterioration. Considers internal conditions only where they have a direct bearing on external corrosion. Micrographs. 26 ref. (R general, CI)

202-R. (Book) **Corrosion Testing.** Francis L. LaQue. 89 pages. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa., $1.50.

Corrosion testing programs and methods of corrosion testing, many of which have been sponsored by the ASTM. Atmospheric corrosion studies; relations between rust color and corrosion; effects of alloying elements on the resistance of steels and irons to atmospheric corrosion; comparison of atmospheres; and galvanic corrosion. Originally presented as the Edgar Marburg Lecture. (R11)

203-R. (Book) **Textiles and Their Testing.** 86 pages. 1949. His Majesty's Stationery Office, London W.C.2, England. (Selected Government Research Reports, v. 4.)

Results of tests on durability of fabric. Includes metal plated fabric and nylon. (R general, Q9)

S

INSPECTION AND CONTROL

171-S. Measuring Average Thickness of Plated Coatings. *Metal Finishing,* v. 50, Mar. 1952, p. 81.

Calculation method. Table gives factors applicable to 13 different metals most commonly electrodeposited. (S14, L17)

172-S. Fluorescent Penetrant Inspection of Jet Propulsion Engine Component Parts. W. B. Buckman. *Non-Destructive Testing,* v. 10, Winter 1951-52, p. 11-13.

The basic steps and principles in fluorescent penetrant inspection and its application to above parts. (S13)

173-S. Non-Destructive Testing as Applied to Tank Parts Inspection. J. K. McDowell. *Non-Destructive Testing,* v. 10, Winter 1951-52, p. 14-15.

Radiographic and magnetic-particle inspection for military tanks made at Rock Island Arsenal. (S13, ST)

174-S. Testing of Railroad Rails by the Ultrasonic Resonance Method. Peter K. Bloch. *Non-Destructive Testing,* v. 10, Winter 1951-52, p. 16-18.

The ultrasonic resonance method lends itself to the design of relatively simple, portable, battery-operated equipment. In addition to testing rail ends at joint, this equipment is practical for testing rail in other critical locations such as frogs, switches, grade crossings, water pans, tunnels, etc. (S13, CN)

175-S. Magnetic Particle Inspection of Jet Engine Parts. A. Robinson. *Non-Destructive Testing,* v. 10, Winter 1951-52, p. 19-23.

Value as an aid in design of units and in selection of materials, determining the quality of incoming materials, and investigating new processing methods. (S13)

176-S. Magnetic Particle Inspection. C. M. Geist. *Non-Destructive Testing,* v. 10, Winter 1951-52, p. 27-28.

Utility for metal parts inspection by the manufacturer. Special reference is made to parts welded, highly heat treated, or machined. (S13)

177-S. Radiographic Metallography. (In French.) C. Chaussin. *Métallurgie et la Construction mecanique,* v. 83, Jan. 1952, p. 35-37, 39; Feb. 1952, p. 99-101.

Production, characteristics, and techniques. Applications of X- and γ-rays in the testing of weldments. Sensitivity and value of the methods, and the nature and the production of the rays. (S13, M21)

178-S. Physical Aspects of the Testing of Metals by Means of Ultrasonics. (In French.) H. J. Seemann. *Métaux: Corrosion—Industries,* v. 27, Jan. 1952, p. 14-23.

The problem of the absorption and dispersion of ultrasonic waves in solid bodies of polycrystalline structure, on the basis of the literature. Data are tabulated and charted. 17 ref. (S13)

179-S. The Belgian Method of Ultrasonic Testing of Materials. (In French.) G. A. Homes, Y. Ots, and E. Symon. *Métaux: Corrosion—Industries,* v. 27. Jan. 1952, p. 24-33.

The method and apparatus used. Applications, particularly for the detection of laminations. Typical examples. The value of the method. Schematic diagrams and photographs. (S13)

180-S. Magnetic and Electrical Processes for Nondestructive Testing of Metallic Pieces. (In French.) Werner Jellinghaus. *Metaux: Corrosion—Industries,* v. 27, Jan. 1952, p. 34-43.

Reviews and evaluates these processes on the basis of the literature. Apparatus is illustrated by circuit and schematic diagrams. 15 ref. (S13)

181-S. Nondestructive Materials Testing by Means of Ultrasonics Using the Transit-Time Echo Process. (In German.) Adolf Lutsch. *Archiv für das Eisenhüttenwesen,* v. 23, Jan.-Feb. 1952, p. 57-65.

The process and how it can be used to determine grain structure and detect defects in metals. Tables, graphs, diagrams, photographs, and micrographs. 21 ref. (S13, M23)

182-S. Processes for the Determination of the Gas Content of Light Metals. I. Bases of the Determination Process. II. Plant Processes. III. Laboratory Processes. (In German.) H. Kostron. *Metall,* v. 6, Mar. 1952, p. 115-123.

A review on the basis of the literature. The process of extraction at high temperatures seems to provide the most exact results; however, it is said to be too complicated for general use. Actually deals only with Al and its alloys. Need for further research and its probable direction. 38 ref. (S11, Al)

183-S. Electromagnetic Thickness Gages Using a Magnetic Circuit. (In German.) J. H. Zaat. *Metalloberfläche,* ser. A, v. 5, Dec. 1951, p. A185-A191.

Investigations using a magnetic circuit on nonferromagnetic layers. Results are tabulated and charted; possibilities of errors are indicated. (S14)

184-S. Measurement of Luster as a Method of Evaluating Metallic Surfaces. (In German.) Joh. Elze and H. Grüss. *Metalloberfläche,* ser. A, v. 6, Feb. 1952, p. A17-A23.

Instrument measures strictly directed reflection, reflection within a selected range of dispersion angle and astigmatism of dispersion. Diagrams, photographs, graphs, photomicrographs, and tables. (S15)

185-S. Effect of a Diffusion Layer on the Electrochemical Determination of Oxygen and Oxide Coatings on Metals. (In German.) F. Todt, S. Kahan, and W. Schwarz. *Zeitschrift für Elektrochemie Berichte der Bunsengesellschaft für Physikalische Chemie,* v. 56, Jan. 1952, p. 19-23.

Shows that current density is proportional to oxygen concentration within wide range in accordance with Fick's first law of diffusion. The gradual drop in current density as result of formation of a diffusion layer is shown to agree with theory. Data are graphed and tabulated. 12 ref. (S11, N1)

186-S. Measuring the Temperature of a Flux During Its Melting. (In Russian.) M. M. Timofeev. *Avtogennoe Delo,* v. 22, July 1951. p. 26-27.

A tungsten-graphite thermocouple and arrangement for measuring the temperature of welding-rod coatings. A calibration curve is given. (S16, K1)

187-S. Spectrochemical Slag and Ore Analysis. (In Swedish.) C. Georg Carlsson. *Jernkontorets Annaler,* v. 135, no. 12, 1951, p. 607-620.

A spectrochemical method previously described in English was tried for the determination of rock constituents of iron-ore concentrates. It was found necessary to incorporate a fluxing operation in order to convert all samples to the same mineralogical state. Typical results are tabulated and charted. (S11, Fe)

188-S. Spectrographic Determination of Palladium, Platinum, Iridium, and Rhodium: Porous Cup Technique. Gilbert H. Ayres and Eugene W. Berg. *Analytical Chemistry,* v. 24, Mar. 1952, p. 465-469.

A method for determination of Pd and for simultaneous determination of Pt, Ir, and Rh in solution. The working range for Pd is 5-160 ppm. Tables and graphs. (S11, EG-c)

189-S. Spectrophotometric Determination of Zirconium. E. W. Kiefer and D. F. Boltz. *Analytical Chemistry,* v. 24, Mar. 1952, p. 542-544.

A micro-method for 1-80 ppm. Table and graphs. (S11, Zr)

190-S. Radioisotopes Aid Metallurgy. Part 2. Gordon H. Guest. *Canadian Metals,* v. 15, Mar. 1952, p. 18-19.

Concludes review of present and potential applications in corrosion, steelmaking, and other problems. 16 ref.
(S19, R general, D general, ST)

191-S. Using Iridium 192 for Castings Inspection. *Canadian Metals,* v. 15, Mar. 1952, p. 41.

Procedure of Ford Motor Co. of Canada, Ltd. (S19, S13)

192-S. Crack-Detector for Wire Threads. John H. Jupe. *Electronics,* v. 25, Apr. 1952, p. 226.

New crack detector of French origin has many applications in connection with manufacture of radio tubes, picture tubes, and electric light bulbs because it can be used for thin wires. Diameters from 0.8 to 32 mm. can be handled irrespective of whether they are insulated or nonmagnetic. (S13, Mo, W)

193-S. A Gauge for Testing Metal Coating Thickness Suitable for Use With Paints, Ceramic Coatings, Plastic or Paper. *Finish,* v. 9, Apr. 1952, p. 17.

Thickness of coatings can now be measured within 0.0005 in. accuracy by a new instrument built by the Ryan Development Laboratory and designed by the National Bureau of Standards. (S14)

194-S. Temperatures of Moving Strip Checked Continuously at Alan Wood. Warren Walker, Jr. *Industrial Heating,* v. 19, Mar. 1952, p. 455-456, 458, 460.

Equipment and procedures of Alan Wood Steel Co., Conshohocken, Pa. (S16, F23, ST)

195-S. A New Method for Surface Flaw Detection. *Industry & Welding,* v. 25, Apr. 1952, p. 79-80.

The Faxfilm process in which an exact reverse replica of a test surface is quickly made in clear plastic. Projection of this replica in a microprojector provides a magnified representation of the surface, with marked three-dimensional effect. (S13)

196-S. Recording Device Checks Quality of Automatic Welds. George A. Hatfield. *Industry & Welding,* v. 25, Apr. 1952, p. 86-88.

Device is connected across the electrode and work to record voltage pattern of a weld. To correlate the pattern on the chart with the welded part, both the part and its chart pattern are numbered, and if the chart curve deviates from normal, the part is x-rayed. (S18, K1)

197-S. Fundamental Reactions in the Vacuum-Fusion Method and Its Application to the Determination of O_2, N_2, and H_2 in Mo, Th, Ti, U, V, and Zr. H. A. Sloman, C. A. Harvey, and O. Kubaschewski. *Journal of the Institute of Metals,* v. 80, Mar. 1952, p. 391-407.

Application of the method to six metals. A mechanism for the reactions forming the basis of the method, derived from practical results and thermodynamical calculations. Results showing the relation between gas contents and methods of preparation or subsequent treatments of the various metals, together with some observations on effects of the

gaseous elements on their properties. Detailed derivations of thermodynamic data used are given in an Appendix. Data are tabulated. 10 ref. (S11, P12)

198-S. The Opaque-Stop Microscope as a Means of Studying Surface Relief. W. M. Lomer and P. L. Pratt. *Journal of the Institute of Metals,* v. 80, Mar. 1952, p. 409-411.

Some results obtained by the above method as applied to metallic and nonmetallic surfaces. (S15)

199-S. A Magnetic Thickness Gauge of New Design. E. G. Harrison. *Journal of Scientific Instruments,* v. 29, Mar. 1952, p. 89-91.

The instrument employs a movable permanent magnet to produce the balancing force; the same magnet also serves to energize the soft iron armature. Accuracy compares favorably with that of other instruments. Modifications whereby the range may be extended in both directions. (S14)

200-S. New Steel Compositions to Conserve Critical Alloying Elements. *Materials & Methods,* v. 35, Mar. 1952, p. 121.

Tables supplement data published in the Oct. 1951 issue; see item 147-V, 1951. Covers standard steels; new steels developed to conserve nickel; alternate boron steels; and tentative-standard boron steels. (S22, CN, AY)

201-S. Nuclear Reaction Radiography and Auto-Radiography of Metals. Mats Hillert. *Metal Treatment and Drop Forging,* v. 19, Mar. 1952, p. 135-137.

New radiographic method called nuclear reaction radiography, with particular reference to the examination of an Fe-B alloy. A number of controlling factors for good results. Photomicrographs. (S13, M23, Fe, AY)

202-S. A High-Resolution Surface-Profile Microscope. S. Tolansky. *Nature,* v. 169, Mar. 15, 1952, p. 445-446.

Describes improvements made by reversing the illumination, using a bright field crossed by a dark line, instead of a light slit on a dark field. (S15)

203-S. Automatic Process Controls in the Steel Industry. E. Whitehead. *Research,* v. 5, Mar. 1952, p. 133-139.

Types of control being applied in the steel industry, with specific reference to automatic control of gas booster fans, gas producers, and openhearth furnaces. Considerable savings in manpower and maintenance have already been achieved. Extensive research is being carried out to develop control systems suitable for some of the many other processes used in steel production. (S18, D general, ST, Fe)

204-S. Holland Standardizes. Part I. F. van Teutem. *Standardization,* v. 23, Mar. 1952, p. 68-74, 92.

An illustrated review of important industrial organizations in Holland and their experiences with standardization. (To be continued.) (S22)

205-S. X-ray Fluorescence Analysis—Nondestructive Testing at Shop Level. Fred Behr. *Steel,* v. 130, Mar. 24, 1952, p. 70-71.

Method which identifies each element in 3 to 5 min. after specimens are prepared. (S11)

206-S. Ultrasonic Flaw Detection. (In Polish.) J. Tabin. *Prace Glownego Instytutu Metalurgii,* v. 3, No. 6, 1951, p. 517-526.

Various methods used in ultrasonic production testing, and principles of operation and of technique. Graphs, diagrams, and micrographs. (S13)

207-S. Shadow Method of Measuring the Smoothness of Surfaces. (In Russian.) V. V. Bernavskii. *Stanki i Instrument,* v. 22, Aug. 1951, p. 17-19.

Use of a microscope and light source. (S15)

208-S. Cast Aluminium Alloys. *Automobile Engineer,* v. 42, Mar. 1952, p. 100.

Provides a table for reference to the standard designations and trade names of related specifications. (S22, Al)

209-S. Advantages of X-Ray Inspection. J. Rigby. *Canadian Metals,* v. 15, Apr. 1, 1952, p. 36-37.

Limitations of X-rays, flaw location, scatter effects, penetration, fluoroscopy, and limitation of radiography. Gamma radiography is included, noting that radioisotopes are adding versatility by offsetting cost, portability, and range limitations. (S13)

210-S. A New Apparatus for Direct Spectro-Chemical Analysis. A. Hans. *Engineers' Digest,* v. 13, Mar. 1952, p. 82. (Translated and condensed.)

Previously abstracted from *Revue Universelle des Mines de la Métallurgie des Travaux Publics des Sciences et des Arts appliques a l'Industrie.* See item 166-S, 1952. (S11)

211-S. Non-Stop From Slab to Strip. Warren Walker, Jr. *Instrumentation,* v. 5, 1st qtr., 1952, p. 13-14.

Temperature measurement and control in 30-in. strip mill of Alan Wood Steel Co., Conshohocken, Pa. (S16, F23, ST)

212-S. Analytical Methods for the Determination of Cyanates in Plating Wastes and in Effluents From Treatment Processes. Barnett F. Dodge and Walter Zabban. *Plating,* v. 39, Apr. 1952, p. 381-384.

Several methods were studied and it was finally concluded that the use of Nessler's reagent was both the simplest and the shortest. Details are tabulated and charted. Recommended routine procedure. (S11, L17)

213-S. Symposium on Industrial Radiology. An Analysis of Radiographic Image Quality. D. Bromley. **The Present State of Non-Destructive Testing of Materials in Germany.** R. Berthold. *Welding and Metal Fabrication,* v. 20, Mar. 1952, p. 110-112.

Radiographic inspection of welds and the quality of radiographs. (To be continued.) (S13)

214-S. (Book) **Electronic Applications.** Henry A. Miller. 110 pages. 1951. E. & F. N. Spon, Ltd., 22 Henrietta St., London, W.C.2, England.

Includes diagrams and photographs of a wide range of present applications. Electron tubes, electronic motor control, regulating and counting, detecting and testing, electronic temperature control, photoelectric control, radio, radio control, radar, and television, electronics in medicine, and miscellaneous applications of electron tubes. (S general)

215-S. (Book) **Industrial Uses of Radioactive Fission Products.** 102 pages, Sept. 1951, Stanford Research Institute, Stanford, Calif.

On the basis of a field survey and correspondence, Stanford Research Institute has evaluated preliminary suggestions for specific uses of fission products showing industrial promise. Introduction; conclusions; technical and engineering considerations; marketing considerations; cold sterilization of drugs, medical supplies and foods; activation of chemical reactions; phosphor activation; static elimination and miscellaneous uses; penetration and detectability of radiation; economic considerations; and fission product research program. Includes 4-page bibliography. (S19)

216-S. (Book) **Magnetic and Electrical Methods of Non-Destructive Testing.** D. M. Lewis. 242 pages. 1951. George Allen & Unwin, Ltd., Ruskin House, Museum St., London W.C.1, England.

Intended as a work of reference for the technicians in ferrous and nonferrous metal making and working industries. Numerous graphs, diagrams, and illustrations. (S13)

217-S. (Book) **A New Approach to Engineering Tolerances.** J. Gilson. 99 pages. 1951. Machinery Publishing Co., Ltd., Clifton House, Euston Rd., London N.W.1, England.

A critical presentation of the considerations necessary for the allocation and maintenance of realistic tolerances in modern economic production. Production factors and economic tolerances for various fabrication and assembly processes, means of expressing tolerances on drawings, effects of tolerances on fits, and standard limit and fit systems. (S22, G general)

218-S. (Book) **The Science of Precision Measurement.** 256 pages. DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill. $3.50.

Interprets the nationally and internationally accepted lineal standard of measurement by giving instruction and showing its practical application to production and inspection of manufactured parts. Accuracy necessary to control thousandths-inch production tolerances. Practical procedures in utilizing instruments such as gage blocks and gaging instruments. A new method using optical flats and a "visible scale" to determine surface flatness, finish, parallelism is introduced. Recommended procedures for statistical sampling of parts for dimensional quality control. Mobile inspection systems. (S14)

T

APPLICATIONS OF METALS IN EQUIPMENT

164-T. Titanium. William S. Cockrell. *Aeronautical Engineering Review,* XX v. 11, Mar. 1952, p. 44-46, 54.

See abstract of "Titanium in Aircraft Production", *Light Metal Age;* item 43-T, 1952. (T24, K general, G general, J general, Ti)

165-T. Stainless Steel Boosts Service From Plant Units. *Coal Age,* v. 57, Mar. 1952, p. 92-95.

Application of stainless plates, screens, and fittings at Sunnyhill Coal Co., New Lexington, Ohio. Problems of screen blinding, choked chutes, corroding of pipe threads and adjusting screws are solved. (T28, SS)

166-T. The Development of a Temperature Limit and Overheat Control. N. D. B. Harris. *Gas Journal,* v. 269, Feb. 27, 1952, p. 525-528.

Various metal combinations used in the cut-off system. Diagrams. (T8, S16)

167-T. Redesign for Die Casting. Fenton Miller and James Samways. *Machine Design,* v. 24, Mar. 1952, p. 143-145.

Adoption of pressure die-cast Al construction of parts for small power lawnmowers. (T10, E13, Al)

168-T. Gas Turbine Engine Materials. R. H. Thielemann, J. C. Mertz, and W. P. Eddy, Jr. *Machine Design,* v. 24, Mar. 1952, p. 216, 218, 220, 223, 225. (A condensation.)

Various materials which can be substituted for stainless alloys in

high-temperature service. Need for better materials is emphasized. (T25, SG-h)

169-T. Recent Developments in Francis Turbines. Wm. J. Rheingans. *Mechanical Engineering,* v. 74, Mar. 1952, p. 189-196, 211.

Trend in turbine design is toward reduction in over-all weight and cost by use of welded plate steel construction, and by increasing the casing-inlet velocities. The increased use of stainless steels and Al bronzes to resist pitting corrosion and erosion results in a reduction of maintenance and downtime and other advantages. (T25, R2, SS, CN, Al)

170-T. Aluminium As a Shipbuilding Material. E. C. B. Corlett. *Metal Industry,* v. 80, Feb. 29, 1952, p. 163-167. (A condensation.)

Materials and their present status, methods available for joining them; future trends. (T22, K general, Al)

171-T. IBM: Major User of Metal Powder Parts. *Precision Metal Molding,* v. 10, Mar. 1952, p. 34-36.

Various reasons for the use of powder parts. Applications in IBM business machines. (T10, H general)

172-T. To Take Full Advantage of Die Castings, Westinghouse Has Redesigned Its Fan Motor Housings. *Precision Metal Molding,* v. 10, Mar. 1952, p. 32-33, 73-75.

Al die-cast motor housing which is flexible and ductile. (T7, Al)

173-T. A Look at the First Ford Overhead-Valve Engine. *SAE Journal,* v. 60, Mar. 1952, p. 35-41. (Based on "The New Ford Six-Cylinder Engine," by E. S. MacPherson.)

Includes illustrations with descriptive captions. Compares new engine with L-head counterpart; constructural features, how engine is lubricated, and performance data. Various metals used, i.e. Al pistons, Cu radiators, etc. (T21, Al, Cu, ST)

174-T. Building the Walker Bulldog Tank. *SAE Journal,* v. 60, Mar. 1952, p. 54-58. (Based on "Walker Bulldog —Its Design and Production", by Edward N. Cole and Harold G. Warner.)

Hull fabrication, turret ball-bearing race manufacture, and turret and hull assembly. Mentions SAE 4140 steel and cast iron. Principal fabrication operations are machining, welding, and induction hardening. (T2, AY, CI)

175-T. Astronomy and the Measurement of Time. (In French and German.) E. Guyot. *Pro-Metal,* v. 4, Dec. 1951, p. 915-916.

The main factor in development of the modern precision timepiece is shown to be the increase in the quality of the metals used. (T9)

176-T. Copper Alloys in the Manufacture of Unfinished Watch Movements. (In French and German.) Philippe De Coulon. *Pro-Metal,* v. 4, Dec. 1951, p. 917-918.

Various processes necessary for the manufacture of so-called "blank" movements. Emphasizes the role of certain Cu alloys, usually 60% Cu, 38% Zn, and 1.5-2% Pb. (T9, Cu)

177-T. Problems of Watch Manufacturing. (In French and German.) Andre Chappuis. *Pro-Metal,* v. 4, Dec. 1951, p. 919-921.

In particular the problems presented by correct choice of alloys for watch springs. Properties of various alloys used for this purpose. (T9)

178-T. Watch Cases of German Silver. (In French and German.) *Pro-Metal,* v. 4, Dec. 1951, p. 921-922.

The mechanical properties necessary. German silver, actually a brass with Ni additions, is used most widely. Working methods and various plating methods. (T9, G general, Q general, L17, Cu)

179-T. Brass in the Production of Escapement Levers. (In French and German.) A. Simon-Vermot. *Pro-Metal,* v. 4, Dec. 1951, p. 923-925.

Mechanical and structural properties required of the materials. Testing methods for such alloys. (T9, Q general, Cu)

180-T. Copper Alloys in the Watch Industry. (In French and German.) *Pro-Metal,* v. 4, Dec. 1951, p. 928-933.

Alloys used in the industry and their properties. Data are charted. (T9, Cu)

181-T. The Manufacture of Watch and Clock Cases. (In French and German.) Charles Hirschy. *Pro-Metal,* v. 4, Dec. 1951, p. 934-936.

Various factors, such as design, price, material, and finish. (T9)

182-T. Theoretical Basis of Heat Production in the High-Frequency and Electric-Arc Furnaces. (In German.) Fritz Walter. *Archiv für das Eisenhüttenwesen,* v. 22, Nov.-Dec. 1951, p. 355-365.

Heat production by alternating electromagnetic fields of force, and the influence of a.c. frequency, permeability, and electrical conductivity of the radiator upon energy consumption. (T5)

183-T. Possibilities of Application for Cast Aluminum, Particularly in Automobile Construction. Curt Bücken. (In German.) *Metall,* v. 6, Mar. 1952, p. 123-128.

A number of applications not usually considered in the German aluminum industry. Details of casting, welding, and surface treatment. Data are tabulated. (T21, E general, K general, L general, Al)

184-T. Recommendation for Design and Operation of Molybdenum-Wound Hydrogen Atmosphere Furnaces. W. P. Keith. *American Ceramic Society Bulletin,* Mar. 1952, p. 76-78.

Use of Mo as winding on furnace tubes. Temperature-resistivity characteristics of Mo. Refractory requirements for this type of furnace. (T5, P11, Mo)

185-T. Skyscrapers Clad in Metal Coats. *Business Week,* Mar. 29, 1952, p. 72-74, 77.

Four Pittsburgh office buildings in the final stages of construction. Three are clad in stainless steel, one in aluminum. Primary advantages are weight and space saving and ease of maintenance. (T26, Al, SS)

186-T. Industrial Applications of Stellite. B. J. MacKenzie. *Canadian Metals,* v. 15, Mar. 1952, p. 48, 51-52.

Stellite has very high wear resistance and keeps its hardness up to 1800° F. This property combined with a low coefficient of friction and high corrosion resistance gives it unique applications. (T general, Q9, R general, Co)

187-T. Basic Structural Design for Transmission Substations Including Light Metals. *Electrical Engineering,* v. 7, Apr. 1952, p. 344-350. (To be published in *AIEE Trnsactions,* v. 71, 1952).

A classification of structures for transmission substations with recommendations for choosing suitable materials and designs. Steel, aluminum, wood, and concrete are considered. Methods of determining design loadings; industry practices regarding design and fabrication standards. 22 ref. (T1)

188-T. Skyscraper Sheathed in Aluminum. *Engineering News-Record,* v. 148, Apr. 3, 1952, p. 67-71.

Design and construction of Alcoa building in Pittsburgh. (T26, Al)

189-T. Lead Vessels in Radioactive Work. C. Fisher. *Industrial Chemist and Chemical Manufacturer,* v. 28, Mar. 1952, p. 120-124.

Various types of equipment which have been designed to afford protection from harmful radiation. (T29, Pb)

190-T. Specifications for Design of Hot Metal Ladles. *Iron and Steel Engineer,* v. 29, Mar. 1952, p. LS-1-LS-13.

Reproduces AISE Standard No. 9 (Tentative), Sept. 30, 1951. Simplified design and analysis procedures for open-top hot-metal ladles. Results compared with laboratory tests and actual design practice. (T5, S22, D9)

191-T. Precision Control Speeds Shell Production. W. G. Patton. *Iron Age,* v. 169, Apr. 3, 1952, p. 127-131.

Production of artillery shells at Chevrolet's St. Louis plant, starting with the carbon steel billets through packaging of shells for shipment. Operations include hot forging, rough and finish turning, nosing, finish grinding, welding and painting. (T2, CN)

192-T. Equipment for Use With High-Strength Hydrogen Peroxide. Noah S. Davis, Jr., and John H. Keefe, Jr. *Journal of the American Rocket Society,* v. 22, Mar.-Apr. 1952, p. 63-69.

Results of compatibility tests on various materials, including metals, plastics, and lubricants. General equipment-design considerations and methods of preparing the equipment for H_2O_2 service. Pumps, containers, piping, flexible hose, valves, and reactors are examples of the equipment. (T29, Al, Cu, Pb, Fe, Li, SS)

193-T. A Design for Standard Resistance Coils. C. R. Barber, A. Gridley, and J. A. Hall. *Journal of Scientific Instruments,* v. 29, Mar. 1952, p. 65-69.

A new method for the construction of resistance coils especially suitable for use in bridge construction. Full details of methods used in the construction and in heat treatment of the wire in order to obtain good stability. Manganin wire is used. (T1, J general, Cu)

194-T. Light Alloy in Agricultural Machinery. *Light Metals,* v. 15, Mar. 1952, p. 90-92.

Several farm implements in which Al and other light alloys have found practical application. (T3, Al)

195-T. Monumental Doors in Cast Light Alloy. *Light Metals,* v. 15, Mar. 1952, p. 95.

Doors installed in new British Government office building. (T26, Al)

196-T. Extrusions and Die Castings in a New Textile Machine. *Modern Metals,* v. 8, Mar. 1952, p. 34.

Application and advantages of Al. (T29, Al)

197-T. The Aluminum Food Can in Europe. *Modern Metals,* v. 8, Mar. 1952, p. 26-28, 30-32.

Successful packaging of a great variety of foodstuffs in Al cans. (T29, Al)

198-T. Preserving Tanks and Trucks With Aluminum Foil. *Modern Metals,* v. 8, Mar. 1952, p. 46, 49.

How foil is protecting tanks, trucks and other vehicles against water damage during storage and shipment. (T10, R10, Al)

199-T. Research on Dental Materials at the National Bureau of Standards; a Review and Bibliography. I. C. Schoonover and Wilmer Souder. *National Bureau of Standards,* Circular 497, Aug. 15, 1950. 14 pages.

Physical and chemical properties and specifications of metallic and nonmetallic dental materials. (T10, P general, S22)

200-T. Military Vehicles Sealed for Storage. *Steel,* v. 130, Mar. 24, 1952, p. 81.

Tests show laminated seal with Al foil keeps moisture out. New seal lasts longer. Ventilator prevents

condensation and evaporation inside hulls. (T2, T10, R10, Al)

201-T. Heating in Vacuo by an External Radiation Source. A. Leemans and R. Kompfner. *Vacuum,* v. 1, July 1951, p. 203-204.

A tungsten-filament lamp and an ellipsoidal reflector may be used to heat miscellaneous small objects. Theory, and several applications in electron-tube construction, localized heating, and soldering or brazing. (T5, K7, K8, J general)

202-T. Use of Cast Metal Offers Important Savings for Limited Manufacture. Frank Charity. *Western Metals,* v. 10, Mar. 1952, p. 41-43.

Use of castings as substitutes for tooling of metal, plastic, rubber, and leather products in small or moderately large quantities. Comparative mechanical and physical properties of five types are tabulated. Foundry practice and finishing methods. (T6, E general)

203-T. Light-Alloy Ship Funnels. (In French.) André Chevrier. *Revue de l'Aluminium,* v. 29, Jan. 1952, p. 18-23.

Advantages and application to the trans-Atlantic liner "United States". (T22, Al)

204-T. Esthetic Contributions of Aluminum to One of the New Bridges at Lyon. (In French.) Andre Mogaray. *Revue de l'Aluminium,* v. 29, Jan. 1952, p. 25-27.

Cast figures and rail grillwork. (T26, Al)

205-T. Special Engines. (In French.) Maurice Victor. *Revue de l'Aluminium,* v. 29, Jan. 1952, p. 31-39.

Various types of guided missiles, with emphasis on their use of Al and Mg alloys. (T2, Al, Mg)

206-T. Fabrication of Mountain-Rescue Equipment. (In French.) M. Devies. *Revue de l'Aluminium,* v. 29, Jan. 1952, p. 40-41.

Sledges, collapsible stretchers, portable radios, etc., with emphasis on applications of light alloys. (T10, Al, Mg)

207-T. Aluminum in Irrigation Equipment. (In French and German.) Ernst Ramser. *Aluminium Suisse,* v. 2, Jan. 1952, p. 14-23.

Al alloys used in various irrigation systems and their advantages. Photographs and tables. (T4, Al)

208-T. Mass Production of Light-Metal Automobile Frames. (Concluded.) (In French and German.) Baron. *Aluminium Suisse,* v. 2, Jan. 1952, p. 26-33.

Use of cast pieces, assembly, spot welding, and painting. The different Al alloys used. (T21, K3, L26, Al)

209-T. Stratospheric Flight and Metallurgy. *Aeroplane,* v. 82, Mar. 21, 1952, p. 334-335. (Based on lecture by P. L. Teed.)

Some special problems, including wear of commutator parts and various effects on corrosion and mechanical properties of miscellaneous ferrous and nonferrous metals. (T24, R general, Q general)

210-T. Production and Metallurgical Characteristics of Hollow Mining Drill Steel in Australia. Daniel Clark. *Australasian Institute of Mining and Metallurgy, Proceedings,* new ser., Mar. 31-June 30, 1947, p. 205-233.

Historical background, manufacture, heat treatment, fatigue failures, and establishment of a central testing station. Illustrations and photomicrographs. 19 ref. (T28, TS)

211-T. Steel Wire Ropes for the Mining Industry. W. Anderson. *Australasian Institute of Mining and Metallurgy, Proceedings,* new ser., Mar. 31-June 30, 1947, p. 301-336.

History, materials, characteristics affecting economy, operating life and serviceability, properties of construction and stresses met, drum and sheave sizes, sheave bearing pressures, storage, handling and maintenance of ropes in service, common factors affecting rope life, and inspection. (T28, CN)

212-T. SAE Engineers Are Cool to Copper Substitutes in Radiators. *Automotive Industries,* v. 106, Apr. 1, 1952, p. 42-43, 102.

Discussion by a panel of experts, appraising Al and copper-clad steel in regard to corrosion, soldering, and other factors. (T21, R4, Al, ST)

213-T. High Frequency Heating Practice. C. E. Eadon-Clarke. *Electronic Engineering,* v. 24, Apr. 1952, p. 210-212.

Illustrated survey. (T2, F1)

214-T. The Role of Castings in Mechanical Engineering Design. W. Hartmann. *Engineers' Digest,* v. 13, Mar. 1952, p. 83-86. (Translated and condensed.)

Previously abstracted from *Zeitschrift des Vereines Deutscher Ingenieure.* See item 160-T, 1952. (T7, CI, ST)

215-T. New Super-Alloys. *Metal Progress,* v. 61, Mar. 1952, p. 127-146.

See abstract of "Gas Turbine Engine Materials," by R. H. Thieleman, J. C. Mertz, and W. P. Eddy, Jr. *Machine Design,* item 168-T, 1952. (T25, SG-h)

216-T. High-Temperature Alloy for Rotor Blades. *Metal Progress,* v. 61, Apr. 1952, p. 148, 150, 154. (Condensed from "Development of a High-Temperature Alloy for Gas Turbine Rotor Blades", G. T. Harris and H. C. Childs.

Previously abstracted from "Symposium on High-Temperature Steels and Alloys for Gas Turbines", *Iron and Steel Institute.* See item 356-T, 1951. (T25, Co, SG-h)

217-T. Selection and Treatment of Die Steels. Part I. Stewart G. Fletcher. *Tool Engineer,* v. 28, Apr. 1952, p. 41-44.

Classification of die steels and various heat treatments. Tabular data on mechanical properties. (To be continued.) (T5, Q general, CN, TS)

218-T. Welded Plate Steel for Francis Turbines. *Welding Engineer,* v. 37, Apr. 1952, p. 36-39. (Condensed from "Recent Developments in Francis Turbines".)

Previously abstracted from *Mechanical Engineering;* item 169-T, 1952. (T25, R2, SS, CN, Al)

219-T. Metallic Lubricants. N. C. Amen. *Steel,* v. 130, Mar. 24, 1952, p. 86.

A study of MoS_2 and Cu-Pb alloys for their individual as well as collective contribution in maintaining bearing surface areas against wear. Petroleum products serve as a vehicle or binder for these materials. (T7, Q9, Cu, Pb)

220-T. (Book) The Gas Turbine Manual. R. J. Welsh and Geoffrey Waller. 243 pages. 1951. Temple Press, Ltd., Bowling Green Lane, London, E.C.1, England.

History, fundamental theory and operational features of the various types of turbines. Properties required in construction materials. Includes glossary. 46 ref. (T25, SG-h)

V

MATERIALS
General Coverage of Specific Materials

65-V. Titanium: How Will You Use This New Metal? *Modern Industry,* v. 23, Mar. 15, 1952, p. 44-50.

Semipopular treatment of results of first three years of commercial development. Production, properties, potential uses, and economics. (Ti)

66-V. Titanium; Its Processing and Subsequent Mechanical Properties. *SAE Journal,* v. 60, Mar. 1952, p. 21-25. (Excerpts from "Design and Manufacturing Techniques With Titanium", by O. A. Wheelon.) (To be published in full in *SAE Quarterly Transactions.*)

Includes physical properties, welding, machining, corrosion resistance, production difficulties, and comparative data for Ti, Al, steel and Monel. (Ti)

67-V. Stainless Clad Steels. Helmut Thielsch. *Welding Journal,* v. 31, Mar. 1952, p. 142s-160s.

Manufacturing methods, carbon diffusion, physical and mechanical properties, heat treatments, welding procedures and processes, dilution, selection of welding electrodes and flame cutting. Photomicrographs, diagrams, and tabular data. 81 ref. (K general, SS, CN)

68-V. Ceramics and Metallurgy. H. W. Greenwood. *Machinery Lloyd* (Overseas Ed.), v. 24, Mar. 1, 1952, p. 89-91.

Recent applications of ceramics in aiding resistance of metals to corrosion, erosion and high temperatures, in the forms of ceramic bodies, coatings, or ceramic-metal combinations. (SG-g, h)

69-V. Titanium; Occurrence, Extraction, Workability, and Properties of the Metal and Its Alloys. A. D. Merriman. *Metal Treatment and Drop Forging,* v. 19, Mar. 1952, p. 99-106. (Ti)

70-V. Decontrolled Stainless: a Solution to Shortages. *Steel,* v. 130, Mar. 24, 1952, p. 72-74.

Lists various straight Cr grades giving pertinent data, such as composition, wear and corrosion resistance, machinability, applications, and price. (SS)

71-V. Newly Developed Bronze Alloys Feature Anti-Galling and Corrosion Resistance. John P. Meyer. *Western Metals,* v. 10, Mar. 1952, p. 35-36.

Two new types developed by Olds Alloys, Los Angeles are a white bronze of the Cr-Ni-Mo type and a Ni bronze of unusually high Pb content. Properties, applications. (Cu)

72-V. Iron. Walter Carroll. "Encyclopedia of Chemical Technology. Vol. 8" (Interscience Encyclopedia, New York), 1952, p. 18-45.

Covers allotropy; physical properties; minerals; sources of iron; extraction of iron from its ores; pig iron; openhearth iron; wrought iron; and electrolytic iron. (P general, B general, D general, Fe)

73-V. Iron Alloys. Walter Carroll. "Encyclopedia of Chemical Technology. Vol. 8" (Interscience Encyclopedia, New York), 1952, p. 45-53.

Relationship betwen the terms "iron" and "steel". The ferro-alloys, and the recently developed group of high-temperature alloys. (Fe, Fe-n, SG-h)

74-V. Lead. T. D. Jones. "Encyclopedia of Chemical Technology. Vol. 8" (Interscience Encyclopedia, New York), 1952, p. 217-253.

Physical and chemical properties, resources, ore beneficiation, smelting, and refining—the last two in greatest detail. Diagrams, graphs, tables. 18 ref. (C21, B general, Pb)

75-V. Lead Alloys. C. H. Hack. "Encyclopedia of Chemical Technology. Vol. 8" (Interscience Encyclopedia, New York), 1952, p. 253-266.

Properties and uses of the various grades of Pb and Pb alloys. Includes specifications, phase diagrams, fabrication and welding processes. Many of the principal uses of Pb alloys are discussed under other headings. (Pb)

(Continued on p. 54)

EMPLOYMENT SERVICE BUREAU

The Employment Service Bureau is operated as a service to members of the American Society for Metals and no charge is made for advertising insertions. The "Positions Wanted" column, however, is restricted to members in good standing of the A.S.M. Ads are limited to 50 words and only one insertion of any one ad. Address answers care of A.S.M., 7301 Euclid Ave., Cleveland 3, O., unless otherwise stated.

POSITIONS OPEN

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PHYSICAL METALLURGIST: Experienced Ph.D. or equivalent, interested in wide variety petroleum metallurgical problems. Leading research organization. Box 5-5.

METALLURGIST: Forge plant manufacturing large and small drop die steel forgings has opening for metallurgist to take charge of metallurgical department. Experience with forge shop metallurgical problems and heat treating of alloy and stainless steels is essential. Box 5-10.

METALLURGIST: For mill production control of high-temperature alloy. Preference given to graduate having some experience with alloys for high-temperature use. Reply giving details of education, experience, and references. Box 5-15.

STEEL SALESMAN: Nationally known steel distributor has opening in western New York State for salesman, age 23-30, with some metallurgical experience or training; sales, mill, or heat treating experience helpful. Give qualifications, education, experience, and enclose photograph. Box 5-20.

METALLOGRAPHER: Fully equipped laboratory. Metallurgy degree not necessary. Nearby universities available for additional college training. Applicant must be thoroughly familiar with metallographic procedures. Work will include both ferrous and nonferrous alloys. For application write: Educational Department, Westinghouse Electric Corp., East Pittsburgh, Pa.

METALLURGY INSTRUCTORS: Two, for department of metallurgy, University of Wisconsin, one to teach nonferrous metallurgy, the other to teach physical metallurgy. Academic appointment. Desire men interested in teaching career. Opportunities for advanced study. Address inquiries to: Department of Metallurgy, University of Wisconsin, Madison 6, Wis.

SALES REPRESENTATIVES: Old established manufacturer of metal cleaning chemicals needs several qualified technical sales representatives for East and Midwest. We want men with personality and sales aptitude, between age of 30-40. Good training period. Car furnished. Liberal drawing account and expenses. No limit on commission earnings. Box 5-25.

METALLURGIST: Young man interested in good secure future with a small but reliable company. Prefer someone with heat treating experience. Commercial heat treating plant. Box 5-70.

SHIPPING SUPERVISOR: Young college trained man with mechanical or metallurgical aptitude, with desire to progress from shipping supervision to sales for steel warehouse in Cleveland. Box 5-85.

METALLURGIST or METALLURGICAL ENGINEER: Young man to assist supervisor of metallurgical laboratory in a variety of experimental and quality control operations. Mental versatility and some mechanical ability necessary. Company a leader in field of powder metallurgy, making carbide cutting tools and high-temperature materials. Located in Western Pennsylvania. Send complete resume and picture. Box 5-90.

METALLURGIST: Recent graduate with some experience in production processes and problems in research development including welding and casting. X-ray required. Will handle own metallographic work, including physical testing. A real connection for the future. Box 5-95.

METALLURGICAL ENGINEER: Graduate engineer with 4-8 years experience in metallurgical development or process engineering. Must have good background of physical and mechanical metallurgy. Work includes development in processing, fabrication, and products in the field of high-temperature metals and alloys. Prefer M.S. degree or equivalent experience in this field. Medium sized progressive organization. Box 5-100.

East

METALLURGIST: Recent graduate to work in laboratory of large plant on development and trouble shooting problems pertaining chiefly to forming and drawing of sheet steel, production of cold rolled strip, and heat treating of tools and dies. Some nonferrous work. Good opportunity for right person. Give details of education, draft status, and salary desired. Box 5-105.

West

PHYSICAL METALLURGIST: To teach physical metallurgy and some courses in process or production metallurgy. Location in a well-known school of mines on a university campus. Salary and rank open, depending on rank and experience. Box 5-30.

POSITIONS WANTED

TECHNICAL LIBRARIAN: Long experience in engineering and metallurgical research laboratories. Make literature searches, set up research and patent records. Member Special Libraries Association, Aslib., A.S.M. Prefer West or Southwest. Box 5-35.

DEVELOPMENT METALLURGIST: Sc.D. degree. Eighteen years supervisory experience as process engineer on research, development, and production problems. Specialized in fabrication methods, material treating, quality control, heat and surface treating, and scrapless forming processes of ferrous and nonferrous metals and alloys. Presently employed, desires position with greater responsibility in research or manufacturing development. Consultant on project engineering and material process control. Box 5-40.

METALLURGICAL CHEMIST: Degree. Age 33, family. Ten years varied industrial experience from mill and foundry to products in production control, development, research, and supervision. Capable of taking charge of laboratory in metals industry. Presently employed. Desires position on West Coast with progressive company. Box 5-45.

WELDING ENGINEER: With 20 years experience in welding, engineering, and research and development. Principal experience in plate fabrication, carbon steels and the alloy metals, in the shop and field. No experience with electric resistance type processes. Seeking permanent location, preferably South, including South America. Box 5-50.

ENGINEER: Degree. Age 30, married, two children. Veteran. Seven years experience in mechanical, chemical, and metallurgical engineering. Desires supervisory position in a design, production, or maintenance group. Experienced in supervision, trouble shooting, construction, procurement of specialized equipment, and preparation of reports. Box 5-55.

METALLURGIST: Twelve years total experience. Married, one child. B.S. in metallurgy. Experience in manufacturing, heat treating, processing, and research concerning openhearth steels. Co-author of several research papers. Experience in stainless steels. Well versed in factors that make good steels. Desire position with reliable concern. Prefer Pittsburgh but will go anywhere. Box 5-60.

CHEMICAL ENGINEER: M.S. degree from University of Southern California. Desires position in private industry not handling government contracts. Age 28, married, noncitizen intending to take out papers. Desires West Coast but will go anywhere in the United States. Box 5-65.

METALLURGICAL ENGINEER: Six years experience directing development and research on high-temperature and corrosive resistant alloys in East. Activities include technical writing, publications, patent disclosures and consulting. Constant proximity with problems of design and stress analysis. Anxious to apply ability, knowledge, and experience in growing organization in need of achievements. Box 5-75.

METALLURGIST: B.S., M.S. degrees. Age 36. Five years experience with toolsteels and stainless. Three years instructor in physical metallurgy. Eight years in stress analysis, heat treatment, welding, specifications, cutting oils, industrial chemicals, and supervision, as chief metallurgist. Desires responsible position with progressive company or as instructor. Desires to locate in Midwest, Northwest or West. Box 5-110.

METALLURGIST: Experienced in quality control of foundry and forge shop products, trouble shooting in materials and processes, consultation with design engineers on materials, processes, engineering properties and design, examination of fractured parts, and determination of special engineering properties. Box 5-115.

METALLURGIST: M.A. degree (Cambridge University). Available soon in United States. Three years experience in research in laboratory of large tube manufacturing company; also experienced in refining, casting, piercing, extrusion, and tube drawing of copper alloys. Single, veteran. Desires research, development, or production position. Box 5-120.

SALES ENGINEER: Age 35, married, two children. Covering Illinois, Iowa, Wisconsin, and Indiana. B.S. degree, mechanical and metallurgical experience in industrial sales engineering and development. Desires connection with progressive organization in Chicago area. Box 5-125.

SALES ENGINEER: Independent. Capable of covering Ohio, Western Pennsylvania, and Indiana. Desires additional line on commission basis. Metallurgical engineering background with experience in development, service, and sales engineering. Only high quality products or materials will be considered. Box 5-130.

METALLURGIST: B.S. degree. Age 35, married, two children. Experienced in development, production, and laboratory control and heat treatment in steel and bearing industries. Supervisory experience. Desires permanent position in Chicago area with expanding company where effort and results will assure progress. Box 5-135.

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Metallograph

Used Bausch & Lomb, Leitz or Zeitz metallograph, priced between $750 and $1250. Box 5-80.

METALLURGIST

Executive

University degrees, energetic, with long experience as executive of modern and advanced nonferrous metals smelting and refining works (copper and copper-base alloys) in Great Britain. Desires similar position in the United States. Box 5-140.

(*Continued from p. 52*)

76-V. Magnesium and Magnesium Alloys. Allan L. Tarr. "Encyclopedia of Chemical Technology. Vol. 8" (Interscience Encyclopedia, New York), 1952, p. 554-593.

History, physical and chemical properties, reactions, analysis, corrosion, production methods (the most detail here), alloys—their properties, microstructure, and transformations, fabrication, finishing, and applications. 34 ref. (Mg)

77-V. Manganese and Manganese Alloys. J. H. Brennan and Charles Longenecker. "Encyclopedia of Chemical Technology. Vol. 8" (Interscience Encyclopedia, New York), 1952, p. 718-735.

History, physical and chemical properties, resources, minerals and their beneficiation, smelting, ferromanganese and silicomanganese production, and alloys—properties and applications. 19 ref. (Mn)

78-V. Mercury. G. A. Roush. "Encyclopedia of Chemical Technology. Vol. 8" (Interscience Encyclopedia, New York), 1952, p. 868-882.

History, physical and chemical properties, occurrence, production processes, alloys, health hazards, economic aspects, and uses. (Hg)

79-V. How to Work With Beryllium-Copper Strip. John T. Richards. *American Machinist,* v. 96, Mar. 31, 1952, p. 99-114.

Press working, heat treating, soldering, brazing, welding, cleaning, and electroplating. Engineering properties of Be-Cu strip, and factors to be considered in designing parts to be produced from it. Graphs, tables, and illustrations. (Cu)

80-V. Nickel-Base Nonferrous Castings. James Vanick. *Foundry,* v. 80, Apr. 1952, p. 94-97, 257-258, 260-261.

Production, composition, properties, corrosion resistance, and welding of Ni-base casting alloys. Graphs and tabular data. (E general, Ni)

81-V. Field of Cemented Carbides Expanded by Titanium Compositions. John C. Redmond and John W. Graham. *Metal Progress,* v. 61, Apr. 1952, p. 67-70.

Properties, fabrication, and application of Kentanium. Comparison is made with tungsten carbide and superalloys. (Ti, W, C-n)

82-V. Utilization of Tungsten. (In French.) *Métallurgie et la Construction mécanique,* v. 83, Jan. 1952, p. 25-27, 29; Mar. 1952, p. 159, 161-162.

Ferrotungsten and its production. Effects of tungsten in carbon and alloy steel. Percentage compositions of tungsten in steels recommended for various purposes. Includes tables and graphs. (Fe-n, W, AY)

83-V. (Book) **Symposium on Titanium.** 106 pages. 1950. Research and Development Board, Dept. of Defense, Washington, D. C.

Talks, papers, and discussions presented Nov. 8-9, 1950. Includes "The Trends of the Electric Power Industry in the United States and Their Relation to Titanium Production", by J. W. Swaren. Other participants included B. S. Mseick, Leonard Jaffee, H. J. Boertzel, W. Lee Williams, Oscar Marzke, J. J. Harwood, Richard R. Kennedy, H. K. Adenstedt, A. B. Kinzel, E. I. Larsen, and V. W. Whitmer. (Ti)

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